Planning & Environment
Resources Regulator

Richard Bailey
MACH Energy Australia Pty Ltd
PO Box 351
MUSWELLBROOK NSW 2333

Our ref: DOC19/494342

28 June 2019

Dear Mr Bailey

Mining Authorisation Number(s) ML1645, ML1713, ML1708, ML1709 and ML1750, Mining Act 1992, MACH Energy Australia Pty Ltd, Approval of Mining Operations Plan (1 July 2019 – 30 June 2020).

NOTICE OF APPROVAL

Pursuant to Condition 3 of Mining Authorisation Number ML1645, ML1713, ML1708, ML1709 and ML1750 the Mining Operations Plan (MOP) that was submitted to the Resources Regulator within the Department of Planning and Environment (the Department) on 4 June 2019 (Department Reference: DOC19/485235) is approved for the period from the date of this approval until **30 June 2020**.

This MOP approved by the Department is limited to:

- the rehabilitation objectives and completion criteria; and
- the schedule of rehabilitation activities proposed for the MOP period.

It is the responsibility of the Authorisation Holder to ensure that all mining and mining related operations described in this MOP are as approved within the relevant Project Approval or Development Consent and all necessary approvals, consents or permits required under the relevant NSW or Commonwealth regulations have been obtained prior to carrying out the operations.

It is the responsibility of the Authorisation Holder to fulfil their obligations and commitments to the rehabilitation outcomes and performance standards as approved by the relevant consent authority to ensure the rehabilitation outcomes identified are achieved.

ASSESSED DEPOSIT
Approval of this MOP has triggered a review of the assessment of the security deposit required to secure funding for the fulfilment of rehabilitation obligations under **ML1645, ML1713, ML1708, ML1709 and ML1750.**

Notice of the change in the security deposit condition related to this MOP approval will be provided separately.

DEFINITIONS

In this letter, words have the meaning given to those terms in the *Mining Act 1992*, unless otherwise specified below.

Department means the Resources Regulator within the NSW Department of Planning and Environment.

Authorisation Holder means the holder of the relevant authorisation(s).

Mining Operations Plan means the project, mining and mining related operations described in the Mount Pleasant Operation prepared by MACH Energy Australia Pty Ltd and dated 30 April 2019, as amended by:

(a) Mount Pleasant Operation – Mining Operation Plan (1 July 2019 – 30 June 2020 (REVISED) – received 4 June 2019 (Department Ref: DOC19/485235)

If you have any questions please contact Jenn Warner directly on (02) 4063 6668.

Yours sincerely,

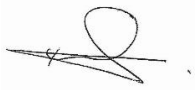
Peter Ainsworth
Manager Environmental Operations (Northern)
Compliance Operations
Resources Regulator
NSW Department of Planning and Environment

MACHEnergy

MOUNT PLEASANT OPERATION

MINING OPERATIONS PLAN
AND
REHABILITATION MANAGEMENT PLAN
(1 JULY 2019 – 30 JUNE 2020)

Document ID:	MP001-0000-ENV-PLN-0010		
Company:	MACH Energy Australia Pty Ltd		
Effective Date:	1 July 2019	**Status:**	Issued for Use
Approved By:	Richard Bailey	**Revision Number:**	02

MOUNT PLEASANT OPERATION MINING OPERATIONS PLAN AND REHABILITATION MANAGEMENT PLAN	
Name of Mine:	Mount Pleasant Operation
MOP Commencement Date:	1 July 2019
MOP Completion Date:	30 June 2020
Mining Authorisations (Lease/Licence No):	ML 1645, ML 1713, ML 1708, ML1709 and ML 1750
Name of Authorisation Holder:	MACH Energy Australia Pty Ltd
Name of Mine Operator:	MACH Energy Australia Pty Ltd
Name and Contact Details of Environmental Representative:	Name: Richard Bailey Phone: 0417 412 962 Email: richard.bailey@machenergyaustralia.com.au
Name of Authorisation Holder Representative:	Richard Bailey
Title of Authorisation Holder Representative:	General Manager, Operations
Signature of Authorisation Holder Representative:	
Date:	4 June 2019
Version:	02

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Material Production Schedule during the MOP/RMP Term	Section 2.12	Table 2-2	N/A
Domain Selection	Section 5.1	Table 5-1	Plans 3A to 3E
Rehabilitation Phases	Section 5.3	Table 5-3	N/A
Performance Indicators and Completion Criteria	Section 6.0	Tables 6-1 to 6-5	N/A
Proposed Disturbance and Rehabilitation Activities during the MOP/RMP Term	Section 7.2.6	Table 7-3	Plans 3A to 3E
Summary of Rehabilitation Areas during the MOP/RMP Term	Section 7.3	Table 7-4	Plans 3A to 3E

1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Plan 1A). The village of Aberdeen and locality of Kayuga are also located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively (Plan 1A).

Development of the MPO is undertaken within Mining Lease (ML) 1645, ML 1713, ML 1708, ML 1709 and ML 1750 (Plan 1C) and is operated in accordance with the relevant Authorities for the above MLs and in accordance with NSW Development Consent DA 92/97 for the MPO. Other key approvals, licences and permits for the MPO are described in Section 1.5.

The proponent of the MPO is MACH Energy Australia Pty Ltd (MACH Energy), which purchased the MPO from Coal & Allied Operations Pty Ltd (Coal & Allied) in 2016.

1.1 PURPOSE AND SCOPE

This Mining Operations Plan and Rehabilitation Management Plan (MOP/RMP) for the MPO has been prepared to satisfy the requirements relevant to rehabilitation management under Development Consent DA 92/97 and relevant requirements within ML 1645, ML 1713, ML 1708, ML 1709 and ML 1750.

The requirements of Development Consent DA 92/97 relevant to rehabilitation management at the MPO include:

- Rehabilitation Objectives – Schedule 3, Condition 53;
- Rehabilitation Strategy – Schedule 3, Condition 54;
- Progressive Rehabilitation – Schedule 3, Conditions 55 and 55A; and
- Rehabilitation Management Plan – Schedule 3, Condition 56.

In addition to the rehabilitation requirements of Development Consent DA 92/97, each of the above MLs include requirements relevant to rehabilitation of each ML area and for preparation of a MOP.

The requirements of Conditions 53 to 56 of Schedule 3 of Development Consent DA 92/97, and the relevant requirements of ML 1645, ML 1713, ML 1708, ML 1709 and ML 1750 and where they are addressed in this MOP/RMP, are outlined in Table 1-1 below.

Table 1-1
Development Consent and ML Requirements Relevant to Rehabilitation Management

<table>
<tr><th>MPO Development Consent DA 92/97 and ML Requirement</th><th>Section where addressed in this MOP/RMP</th></tr>
<tr><td colspan="2">Schedule 3, Development Consent DA 92/97</td></tr>
<tr><td>Rehabilitation Objectives
53. The Applicant must rehabilitate the site to the satisfaction of DRG. This rehabilitation must be generally consistent with the conceptual final landform depicted in Figure 4 in Appendix 2, and comply with the objectives in Table 11.
Table 11: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>All areas of the site affected by the development</td><td>• Safe, stable and non-polluting
• Fit for the intended post-mining land use/s</td></tr>
</table></td><td>Section 4

Sections 4.3 and 5.2</td></tr>
</table>

Table 1-1 (Continued)
Development Consent and ML Requirements Relevant to Rehabilitation Management

MPO Development Consent DA 92/97 and ML Requirement		Section where addressed in this MOP/RMP
Areas proposed for native ecosystem re-establishment	• *Restore self-sustaining native woodland ecosystems characteristic of vegetation communities found in the local area, as shown conceptually in Figure 4 in Appendix 2.* • *Establish areas of self-sustaining:* – *riparian habitat, within any diverted and/or re-established creek lines and retained water features;* – *potential habitat for threatened flora and fauna species; and* – *wildlife corridors, as far as is reasonable and feasible, and as shown conceptually in Figure 4 in Appendix 2.*	Sections 4.3, 5.2 and 7.2.3 Section 7.2.3 Section 7.2.3 Section 7.2.3
Areas proposed for agricultural land	• *Establish/restore grassland areas to support sustainable agricultural activities* • *Achieve the nominated land capability classification*	Section 7.2.4 Section 6
Other land affected by the development	• *Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native plant species (unless DRG agrees otherwise)*	Sections 4.3, 5.2 and 6
Final Landform	• *Stable and sustainable for the intended post-mining land use/s* • *Integrated with surrounding natural landforms* • *Incorporate micro-relief and drainage lines that are consistent with surrounding topography, to the greatest extent practicable* • *Maximise surface water drainage to the natural environment (excluding final void catchment)*	Sections 4.2.2, 4.3, 5.2 and 6
Final voids	• *Designed as long term groundwater sinks to maximise ground water flows across back filled pits to the final void* • *Minimise to the greatest extent practicable:* – *the size and depth of final voids;* – *the drainage catchment of final voids;* – *any high wall instability risk; and* – *the risk of flood interaction*	Sections 4.3, 5.2 and 6
Surface infrastructure of the development	• *To be decommissioned and removed, unless DRG agrees otherwise*	Sections 4.3, 5.2 and 6
Rehabilitation materials	• *Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources, to the greatest extent practicable*	Section 7.2.1
Water quality	• *Water retained on the site is fit for the intended post-mining land use/s* • *Water discharged from the site is suitable for receiving waters and fit for aquatic ecology and riparian vegetation*	Sections 4.3, 5.2 and 6
Community	• *Ensure public safety* • *Minimise adverse socio-economic effects associated with mine closure*	Sections 4.3, 5.2 and 6.1

Table 1-1 (Continued)
Development Consent and ML Requirements Relevant to Rehabilitation Management

MPO Development Consent DA 92/97 and ML Requirement	Section where addressed in this MOP/RMP
54. By the end of January 2019, unless otherwise agreed by the Secretary, the Applicant must prepare a Rehabilitation Strategy for the development to the satisfaction of the Secretary. This strategy must: *(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Secretary;* *(b) be prepared in consultation with DRG and Council;* *(c) build upon the Rehabilitation Objectives in Table 11 and the conceptual final landform depicted in Figure 4 in Appendix 2, including identification of opportunities for increasing the areas of woodland and habitat connectivity within the rehabilitated landscape;* *(d) include details of the canopy, sub-canopy, understorey and ground strata species to be established in the rehabilitation areas, with a particular focus on ensuring the achievement of an appropriate level of diversity and mix of functional groups within each target community; and* *(e) include an indicative schedule for the staged rehabilitation of the development.* *The Applicant must implement the approved strategy as approved from time to time by the Secretary.*	Section 1.1 Section 1.1 Section 3 Section 7.2 Section 7.2
Progressive Rehabilitation *55. The Applicant must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable steps must be taken to minimise the total area exposed at any time. Interim stabilisation and temporary vegetation strategies must be employed when areas prone to dust generation, soil erosion and weed incursion cannot be permanently rehabilitated.* *Note: It is accepted that some parts of the site that are progressively rehabilitated may be subject to further disturbance at some later stage of the development.*	Sections 2.10, 4.3 and 7.2.6
55A. The Applicant must implement all reasonable and feasible measures to provide for the interim stabilisation and temporary vegetation of the existing rail loop and infrastructure corridor, as soon as reasonably practicable following the removal of infrastructure as required under condition 37. *Note: The Applicant's obligations under this condition will cease following the transfer or grant of a mining lease over that part of ML 1645 south of Wybong Road to the operator of Bengalla mine (or its nominee).*	Sections 2.9, 2.10 and 7.2.5
Rehabilitation Management Plan *56. By the end of April 2019, unless otherwise agreed by the Secretary, the Applicant must prepare a Rehabilitation Management Plan for the development to the satisfaction of DRG. The plan must:*	This MOP/RMP
(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Secretary;	Section 1.3
(b) be prepared in consultation with the Department, DoI Water, OEH, DPI and Council;	Section 1.7
(c) be prepared in accordance with any relevant DRG Guideline;	Section 1.3
(d) describe how the rehabilitation of the site would achieve the objectives identified in Table 11 and the outcomes described in the Rehabilitation Strategy referred to in condition 54;	Sections 4 to 8
(e) include a detailed plan for the reinstatement and review of the proposed: • *agricultural land capability of grassland areas in the final landform, including a protocol for periodic trials to demonstrate that the land capability is being achieved;* • *rehabilitated woodland areas and fauna habitat, including a protocol for periodic trials to demonstrate that the target vegetation community is being achieved*	Sections 6, 7 and 8

Table 1-1 (Continued)
Development Consent and ML Requirements Relevant to Rehabilitation Management

MPO Development Consent DA 92/97 and ML Requirement	Section where addressed in this MOP/RMP
(f) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and for triggering remedial action (if necessary);	Section 6
(g) describe the measures to be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including mine closure, final landform (including final voids), final land use/s and water management in the in the final landform;	Sections 4, 6.1, 7 and 10
(h) include procedures for the use of interim stabilization and temporary vegetation strategies, where reasonable to minimise the area exposed for dust generation;	Section 2.11
(i) include a program to monitor, independently audit and report on the effectiveness of the measures in condition 56(g), and progress against the detailed performance and completion criteria in condition 56(f);	Sections 8, 11 and 12
(j) to the maximum extent practicable build on and integrate with the other management plans required under this consent; and	Sections 3 and 7.2.1
(k) include detailed scheduling for progressive rehabilitation to be initiated, undertaken and/or completed over the next three years. *The Applicant must implement the management plan as approved by DRG.*	Section 7.2 and Plans 3A to 3E
ML 1645, ML 1713, ML 1708, ML 1709 and ML 1750 Requirements	
Rehabilitation *Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.*	Sections 4, 5.2 and 6
Mining Operations Plan *a) The lease holder must comply with an approved Mining Operations Plan (MOP) in carrying out any significant surface disturbing activities, including mining operations, mining purposes and prospecting. The lease holder must apply to the Minister for approval of a MOP. An approved MOP must be in place prior to commencing any significant surface disturbing activities, including mining operations, mining purposes and prospecting.*	This MOP/RMP
b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which:	Sections 4 to 9
i. Identifies areas that will be disturbed.	Sections 1.4.1 and 2
ii. Details the staging of specific mining operations, mining purposes and prospecting;	Section 2
iii. Identifies how the mine will be managed and rehabilitated to achieve the post mining land use;	Sections 3 to 11
iv. Identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and	Section 3
v. Reflects the conditions of approval under; *1. The Environmental Planning and Assessment Act 1979;* *2. The Protection of the Environment Operations Act 1997; and* *3. Any other approvals relevant to the development including the conditions of this mining lease.*	Sections 1.4, 1.5 and 4.1
(c) The MOP must be prepared in accordance with the ESG3: Mining Operations Plan (MOP) Guidelines September 2013 published on the Department's website at *www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-andforms/pgf/environmental-guidelines*	Section 1.3

1.2 PREVIOUS VERSIONS

The previous MOP/RMP (Amendment A) (i.e. the currently approved MOP/RMP) was approved on 10 October 2018 by the Division of Resources and Geoscience (DRG) within the NSW Department of Planning and Environment (DPE). The previous version covered a MOP/RMP term from 30 June 2018 to 30 June 2019.

1.3 CURRENT VERSION

This MOP/RMP has been prepared to replace the MOP/RMP described in Section 1.2.

This MOP/RMP describes the mining operations and rehabilitation activities at the MPO for the term 1 July 2019 to 30 June 2020 (Plan 3A). This MOP/RMP also describes mining operations and rehabilitation activities that may be undertaken at the MPO beyond this term (up to 30 June 2024) (Plans 3B to 3E). These activities are indicative only and may be subject to change/amendment beyond 30 June 2020.

In accordance with the requirements of Condition 56, Schedule 3, of Development Consent DA 92/97, this MOP/RMP was submitted to the DRG prior to the end of April 2019.

MACH Energy will continue to operate the MPO under the currently approved MOP/RMP (Section 1.2) until this MOP/RMP is approved by the DRG.

Key updates provided in this MOP/RMP include:

- a description of the MPO mining and rehabilitation activities for the term 1 July 2019 to 30 June 2020 (and indicative activities up to 30 June 2024);
- a description of the approved MPO under MOD 4 of Development Consent DA 92/97 granted on 16 November 2018 (Section 1.4.1);
- the outcomes from an updated Environmental Risk Assessment;
- revised rehabilitation performance indicators and completion criteria including quantitative benchmark values for the relevant plant community types to be established in MPO rehabilitation areas (Section 6); and
- relevant aspects from the MPO Rehabilitation Strategy, prepared in accordance with Condition 54, Schedule 3 of Development Consent DA 92/97.

As required by Condition 56, Schedule 3 of Development Consent DA 92/97, a draft version of this MOP/RMP was submitted to the DPE, Department of Industry – Water (DoI Water), Office of Environment and Heritage (OEH), Department of Primary Industries (DPI) and the Muswellbrook Shire Council (MSC) for the purpose of consultation.

This MOP/RMP has been prepared on behalf of MACH Energy by Dr David Freudenberger (whose appointment has been approved by the DPE [letter dated 18/09/18] as a 'suitably qualified and experienced person'), to satisfy the requirements under Condition 56, Schedule 3 of Development Consent DA 92/97.

Consistent with the requirements of Condition 56(c) of Schedule 3 of the Development Consent and the ML requirements, this MOP/RMP has been prepared in accordance with the requirements of the DRG's *ESG3: Mining Operations Plan (MOP) Guidelines* (Department of Trade & Investment, Regional Infrastructure and Services [DTIRIS], 2013) (MOP Guidelines) MOP/RMP.

1.4 HISTORY OF OPERATIONS

1.4.1 State Development Consent

The initial application for Development Consent for the MPO was made in 1997. This was supported by an Environmental Impact Statement (1997 EIS) prepared by ERM Mitchell McCotter (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied. This allowed for the "Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities" at the MPO. The consent allowed for the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 million tonnes per annum (Mtpa).

Environmental Dam 1 (ED1) and an associated gravel access track were constructed in 2004. In November 2005, a high level spillway was added to ED1 to accommodate larger rainfall events.

Prior to MACH Energy acquisition, activities undertaken on-site were largely limited to routine agricultural management activities such as weed and pest control, fence maintenance, fire break and fire trail maintenance, and seed harvesting. Since the Development Consent was granted, regular monitoring of a range of baseline environmental aspects has been undertaken in the vicinity of the MPO, including noise, air quality, surface water and groundwater monitoring.

The MPO Modification (MOD 1) was submitted for approval on 19 May 2010 with a supporting Environmental Assessment (EA) prepared by EMGA Mitchell McLennan (EMGA Mitchell McLennan, 2010), with the following changes proposed:

- The provision of an infrastructure envelope for siting the mine infrastructure.
- The provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line.
- Modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative boundary changes.

MOD 1 was approved on 19 September 2011.

The MPO South Pit Haul Road Modification (MOD 2) was submitted for approval on 30 January 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an internal haul road to enable more efficient access to the South Pit open cut, with no other material changes to the approved MPO. MOD 2 was approved on 29 March 2017.

MOD 3 (the MPO Mine Optimisation Modification) was submitted for approval on 31 May 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017b). MOD 3 proposed the following key changes:

- Extension to the time limit on mining operations from 22 December 2020 to 22 December 2026.
- Extensions to the South Pit Eastern Out of Pit Emplacement to better align with the underlying topography.

MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017 with a supporting Environmental Assessment (EA) prepared by MACH Energy (MACH Energy, 2017c). MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.

MOD 4 was approved on 16 November 2018 by the Secretary of the DPE (under Delegation).

Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform incorporating the MOD 4 infrastructure relocations. Appendix 2 of the modified Development Consent DA 92/97 is provided in Attachment 1 of this MOP/RMP.

The approved surface disturbance plan and the key MOD 4 infrastructure components are shown on Figures 1-1 and 1-2.

1.4.2 Commonwealth Approval

A Referral of the Proposed Action for the MPO was submitted to the then Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) on 16 December 2010, pursuant to the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). The DSEWPC determined, on 4 February 2011, that the Proposed Action required assessment under the EPBC Act through a Public Environment Report.

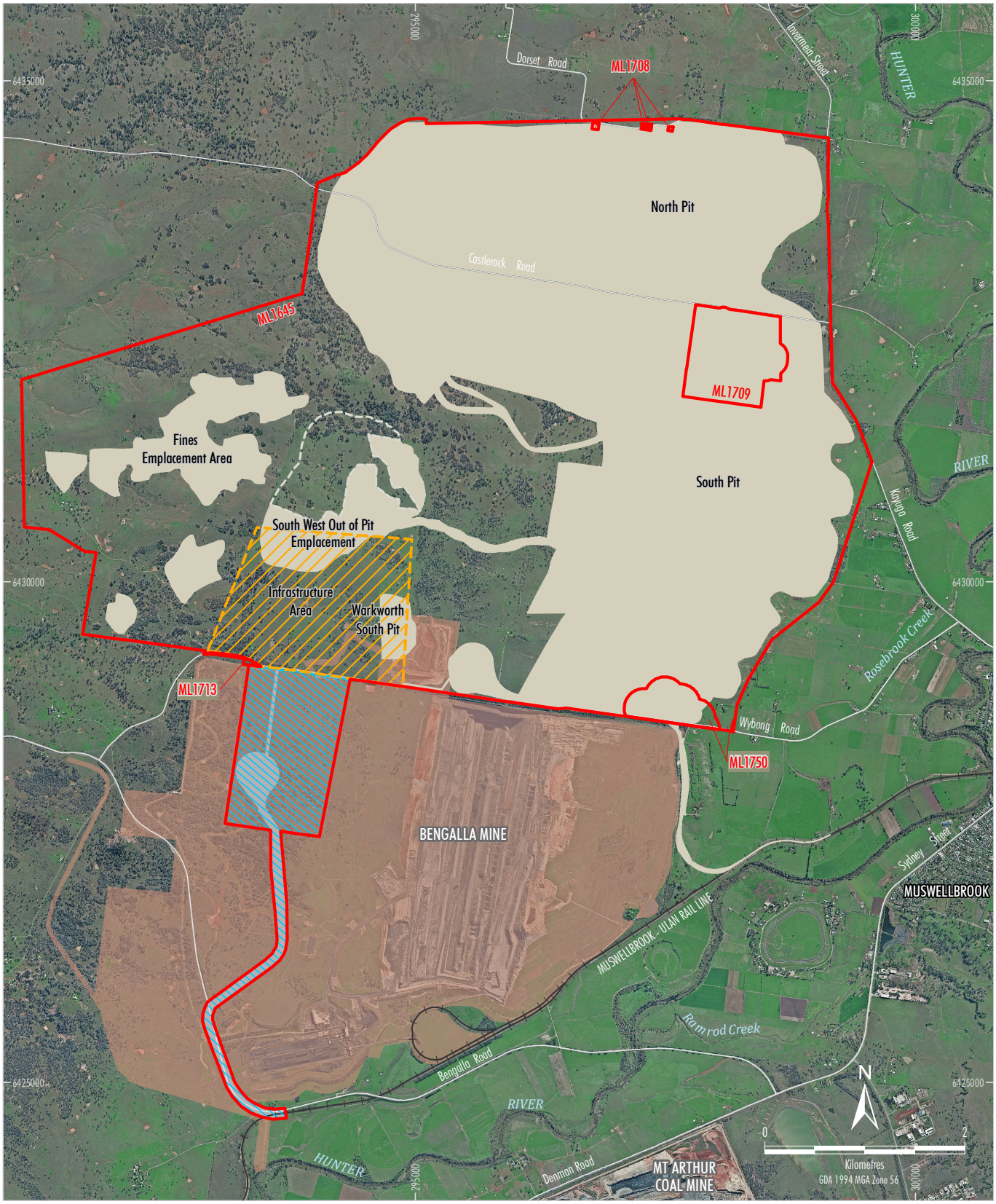
Following a public exhibition period, the Commonwealth approved the MPO under the EPBC Act on 29 February 2012, inclusive of a significant biodiversity offset package. The approval has effect until 28 October 2035.

EPBC Act Approval 2011/5795 includes conditions relevant to rehabilitation and mine closure. These conditions are outlined in Section 4.1.

1.4.3 Mining Leases

ML 1645 was granted for the MPO in 1992. In 2015, ML 1713, ML 1708 and ML 1709 were also obtained for the MPO, as well as ML 1750 in 2017. The locations of these MLs are shown on Plan 1C.

The requirements of the above MLs relevant to rehabilitation and this MOP/RMP and where they are addressed in this MOP/RMP are detailed in Section 1.1 (Table 1-1).



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LEGEND

- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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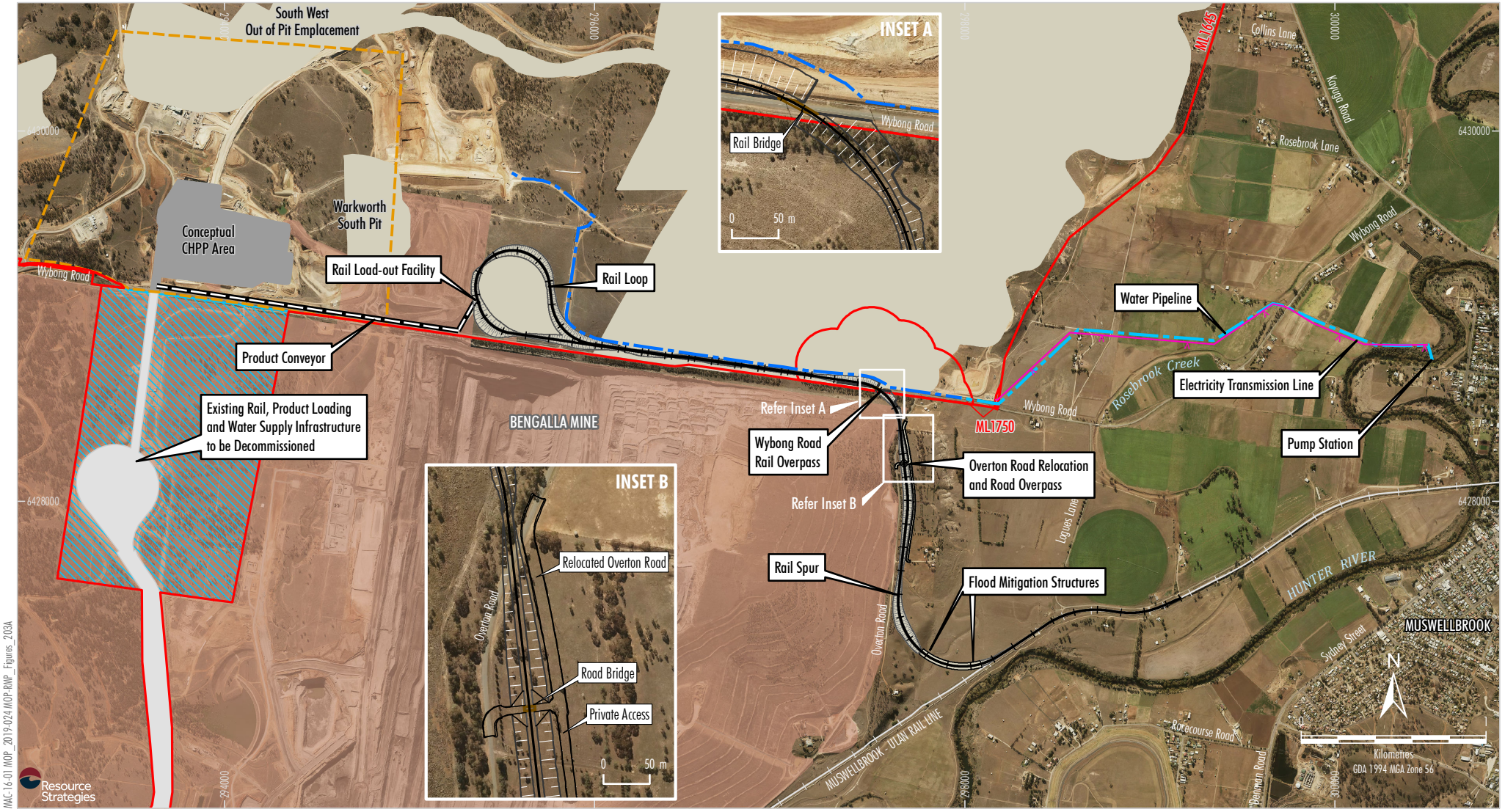
MOUNT PLEASANT OPERATION

Approved Surface Disturbance Plan

Figure 1-1



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LEGEND

- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Infrastructure Area Envelope
- Indicative Off-site Coal Transport Infrastructure
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

Key Elements of Modification 4 [#]

- Rail
- Product Conveyor
- Water Pipeline - Above Ground
- Water Pipeline - Buried
- Pump Station Electricity Transmission Line

[#] Modification includes additional minor components not shown, e.g. access tracks, rail signalling and electricity supply, etc.

NOTE

[1] Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, off-site coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Geoscience (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (July 2018)

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MOUNT PLEASANT OPERATION

General Arrangement of the Key Modification 4 Elements

Figure 1-2

1.5 CURRENT CONSENTS, AUTHORISATIONS AND LICENCES

The key approvals held by MACH Energy for the MPO are detailed in Table 1-2.

Table 1-2
Approvals for the Operation

Approval Number	Description	Issue Date	Expiry Date
Development Consent DA 92/97	State Development Consent for Mount Pleasant Coal Mine (as modified)	19/09/2011	22/12/2026
EPBC Act Approval 2011/5795	Commonwealth approval of the Mount Pleasant Coal Mine	29/02/2012	28/10/2035
Environment Protection Licence (EPL) 20850	NSW Environment Protection Authority (EPA) Licence for Mount Pleasant Operation	24/11/2016	Until the licence is surrendered, suspended or revoked

The MPO is a Level 1 mine as defined in the MOP Guidelines. The MPO was approved under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) in December 1999 by development consent under Division 4 of Part 4 of the Act (relating to State Significant Development). The Minister for Planning is the consent authority for State Significant Developments under Part 4 of the EP&A Act.

The mining titles held by MACH Energy for the MPO are detailed in Table 1-3.

Table 1-3
MPO Mining Titles

Title	Type	Purpose	Grant Date	Expiry Date	Status
AUTH 459	Authorisation	Prospecting	07/04/1992	08/04/2018[1]	Renewal pending
ML 1645	Mining Lease	Prospecting and Mining Coal	17/12/2010	16/12/2031	Granted
ML 1713	Mining Lease	Prospecting and Mining Coal	02/02/2015	02/02/2036	Granted
ML 1708	Mining Lease	Prospecting and Mining Coal	02/02/2015	02/02/2036	Granted
ML 1709	Mining Lease	Prospecting and Mining Coal	02/02/2015	02/02/2036	Granted
ML 1750	Mining Lease	Prospecting and Mining Coal	03/03/2017	03/03/2038	Granted

[1] A renewal request has been submitted and is currently awaiting approval. The existing approval will continue until the renewal is approved.

Water Access Licences (WALs) held by MACH Energy are summarised in Table 1-4.

Table 1-4
MPO Water Access Licences

Water Sharing Plan	Water Source	Licence Number	Entitlement (Unit)
Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009	Hunter Regulated River Alluvial Water Source	18253	74
		18266	68
		18206	24
		18199	5
		18122	33
		18131	60
		21503	21
	Muswellbrook Water Source	23935	41
	Sydney Basin – North Coast Groundwater Source	41437	40
		40298	90
	Krui River Water Source	18336	12
	Hunter Regulated River Water Source	879	224
		880	124
		1113	366
		973	3
		974	210
		975	8
		988	156
		989	8
		1307	37.5
		1229	480
		1230	8
		1259	33.2
		1227	99
		1258	5
		992	75
		7808	36
		702	267
		1260	4.8
		993	265
		1308	15.1
		604	183
		605	8
		677	24
		1338	17.5
		662	275
		663	16
		10775	243
		41438	420

Note: Typically, one (1) Unit represents one (1) megalitre.

1.6 LAND OWNERSHIP AND LAND USE

The site is situated directly north of the existing Bengalla Mine, with the Mt Arthur Mine further south. Dartbrook Mine and the village of Kayuga are situated beyond the northern boundary of the site, with the township of Aberdeen further north again. Agricultural land and the town of Muswellbrook are located to the east of the site. Land to the west of the site is generally used for grazing.

The land uses in the vicinity of the MPO are predominantly agricultural and residential. The area within the MPO MLs (Section 1.5 and Plan 3A) is still predominantly used for cattle grazing.

A schedule of land ownership on and adjacent to the MPO mining titles is contained in Appendix 1 of the Development Consent and shown on Plan 1C. The majority of freehold land within the ML boundary is owned by MACH Energy.

1.7 STAKEHOLDER CONSULTATION

1.7.1 Community Consultative Committee

The Community Consultative Committee (CCC) was formed in 2004, and has since met regularly. The CCC is an important communication and engagement tool, as the group acts as the point of contact to provide feedback between MACH Energy and the community. The CCC is made up of community members, and has previously contained Council representatives.

Coal & Allied presented rehabilitation concepts to the CCC on 3 March 2012. Feedback provided by the CCC included support for the use of analogue (reference/control) sites to assess rehabilitation success and concerns regarding interactions between the MPO and the Bengalla Mine. The use of analogue sites has been incorporated into the completion criteria for the MPO's rehabilitation domains (Section 6). Potential interaction between the MPO's rehabilitation and neighbouring land uses (including the Bengalla Mine) has been risk assessed (Section 3.1), and appropriate action and responses have been developed (Section 9). The CCC has also been provided with an opportunity to comment on the various Modifications submitted for the MPO as part of the public exhibition process.

Members of the community have indicated their preference for a landform that integrates with the surrounding landscape (i.e. does not form the shape of a 'bread loaf'). This is discussed further in Section 4.2.1.

This MOP/RMP will be discussed at the next CCC meeting scheduled to be held on 20 June 2019.

1.7.2 Muswellbrook Shire Council

MACH Energy met with MSC on 9 August 2016. At the meeting, MSC indicated that its key rehabilitation focus is the design of the eastern emplacement and its consistency with the surrounding landscape. The redesign of the final landform, in consideration of comments provided by MSC, is discussed in Section 4.2.1.

MSC also provided comments regarding tree plantings for visual screens, final void minimisation and dust management.

In accordance with the requirements of Condition 54, Schedule 3 of Development Consent DA 92/97 relevant to preparation of the MPO Rehabilitation Strategy, MACH Energy submitted the Rehabilitation Strategy to the MSC for consultation purposes. MACH Energy responded to MSC's comments on the Rehabilitation Strategy and the outcomes from this consultation have also been incorporated where relevant in this MOP/RMP.

A meeting was held with the MSC on 18 April 2019 to discuss the proposed updates to the currently approved MOP/RMP. Feedback from the MSC during this meeting relevant to this MOP/RMP, primarily concerned rehabilitation of the eastern face of the Eastern Out of Pit Overburden Emplacement and the timing associated with the MOD 4 infrastructure works. The indicative schedule for the MOD 4 infrastructure works was addressed by MACH Energy at the meeting. Sections 4, 5 and 7 of this MOP/RMP provide a detailed description of the rehabilitation concepts for the eastern face of the Eastern Out of Pit Overburden Emplacement and the progression of rehabilitation for this landform.

As required by Condition 56, Schedule 3 of Development Consent DA 92/97, this MOP/RMP has been provided to the MSC for comment/review. MACH Energy addressed and responded to the MSC's comments, and no further revisions to this MOP/RMP were necessary.

1.7.3 Other Regulatory Agencies

A meeting was held with the Resources Regulator on 18 April 2019 to discuss the proposed updates to the currently approved MOP/RMP. During this meeting the Resources Regulator advised that the MOP/RMP should address long-term risks to rehabilitation (e.g. geochemical characteristics of the rehabilitation materials), investigate industry research of the rehabilitation of tailings, prioritise direct placement of topsoil and consider co-disposal of tailings. The risks to rehabilitation including characterisation of rehabilitation materials (including soils and overburden) is described in Sections 3.1 and 3.2.1. Section 8.2 provides details of the research areas MACH Energy proposes to focus on during the MOP/RMP term, and includes investigating opportunities for rehabilitation of tailings. The direct placement of topsoil on areas available for rehabilitation is described in Section 3.2.7. The consideration of the co-disposal of tailings is outside the scope of this MOP/RMP. Notwithstanding, MACH Energy committed to consider co-disposal of tailings in the MPO's Waste Management Plan.

In accordance with Condition 56, Schedule 3 of Development Consent DA 92/97, this MOP/RMP has been provided to the DPE, DoI Water, OEH and the DPI for review/comment. No comments on the MOP/RMP from any of these agencies were received. The Resources Regulator is the relevant approval authority for this MOP/RMP.

Significant consultation has been undertaken as part of MODs 3 and 4 which has informed the concepts in this MOP/RMP, in particular the design and rehabilitation concepts for the Eastern Out of Pit Overburden Emplacement. The outcomes of commitments made by MACH Energy as a result of this consultation are reflected in the modified Development Consent approved on 16 November 2018, and are also reflected in the rehabilitation concepts for the MPO final landforms described in Sections 4, 5 and 7 of the MOP/RMP.

1.7.4 Aboriginal Groups

The MPO Aboriginal Heritage Management Plan (AHMP) provides for comprehensive protective and mitigative management measures and methodologies to be implemented for the MPO. The AHMP was prepared in accordance with Condition 36, Schedule 3 of Development Consent DA 92/97, and approved on 5 July 2017.

Development activities at the MPO require assessment and Aboriginal Heritage Impact Permits (AHIPs) under Part 6 of the NSW *National Parks and Wildlife Act 1974*. MACH Energy maintains a list of Registered Aboriginal Parties (RAPs) from consultation throughout the lifetime of the MPO. MACH Energy conducts frequent meetings with the RAPs to discuss Aboriginal issues, and encourages the RAPs to assist in Aboriginal works undertaken on-site.

MACH Energy consulted with the relevant RAPs as a part of the MPO Rail Modification (MOD 4).

2 PROPOSED MINING ACTIVITIES

2.1 PROJECT DESCRIPTION

Development Consent DA 92/97 (as modified) allows for the extraction of 197 Mt of ROM at a rate of up to 10.5 Mtpa and allows for mining operations to be carried out until 22 December 2026. The conceptual general arrangement of the MPO at 2021 (Year 2-3 of the MPO/RMP term) is shown on Figure 1-2.

MACH Energy commenced substantial works at the MPO on 25 November 2016. During 2018, MACH Energy completed the following construction activities on-site, including:

- construction completion of the Mine Infrastructure Area (MIA) buildings, including offices, maintenance workshop, tire and fuel bay, bath houses, Sewage Treatment Plant, car park and water tanks;
- construction completion of the following areas:
  - rail spur and loop;
  - Bengalla Link Road Bridge;
  - Hunter River Pump Station and Pipeline;
  - 66 kilovolt (kV) powerline relocation;
  - substation and switchyard; and
  - Mine Water Dam (MWD), Environmental Dam 2 (ED2), Clean Water and Fines Emplacement Area.
- construction completion and wet commissioning of the Coal Handling and Preparation Plant (CHPP) Separable Portion 1, including bypass, reclaim and Fire Water and Train Load Out Systems; and
- continuing construction of the CHPP, including the rejects system.

Off-site coal transport also commenced in 2018 using the rail infrastructure in accordance with Development Consent DA 92/97 (Condition 7, Schedule 2).

Mining related activities have commenced and have included:

- development of the South Pit at its south-eastern extent (Figure 1-1);
- continued construction of haul road; and
- commencement of rehabilitation of the Eastern Out of Pit Overburden Emplacement adjacent to the South Pit.

Coal was first mined in July 2018, which formed the base of the ROM stockpile.

Development of the South Pit at the south-eastern corner of ML 1645 will progress during the MOP/RMP term (Plans 3A to 3E). The initial portion of the Overburden Emplacement has been constructed between the boxcuts and the eastern boundary of the lease, within the footprint approved by the Development Consent. The Overburden Emplacement is a short haul from the open cut, and will develop into a bund that assists to control the potential environmental impacts of the operation. Mining will continue to progress northwards before developing to the west throughout the remaining mine life (outside of this MOP/RMP term), in accordance with Development Consent DA 92/97.

Construction will continue to progress during the MOP/RMP term, and will involve construction of the major infrastructure elements associated with MOD 4 (i.e. relocation of the rail spur and loop) and the finalisation of other elements (i.e. final modules of the CHPP).

The following construction activities are forecast to be undertaken during the MOP/RMP term:

- progression of construction in DMS 1 and Reject system;
- progression of construction in DMS 2;
- completion of the construction of the wash modules in the CHPP;
- commencement of Flocculant and Magnetite system;
- stage 2 of bypass system increasing its capacity from 750 tonnes per hour (t/hr) to 1500 t/hr;
- progression of final Ausgrid Tie-In for permanent power;
- commencement of Rail Spur and Loop, Train Load Out and Hunter River Pump Station relocation; and
- progressive rehabilitation of temporary construction areas and mining areas.

The following mining related activities are forecast to be undertaken during the MOP/RMP term:

- steady-state coal extraction within the southern extent of the South Pit;
- commencement of development of the South Pit to the north and west;
- completion of associated dams and drains to manage sediment control and water infrastructure in the South Pit; and
- progressive rehabilitation to final landform profiles.

A detailed description of the construction and mining activities over the MOP/RMP term is provided in Sections 2.5 to 2.9.

Further detail of approved mining and construction activities associated with the MPO is provided in the 1997 EIS and the MOD 1 to MOD4 environmental assessments.

2.2 ASSET REGISTER

In accordance with the DRG's MOP Guidelines, the main assets expected to be in each domain at the end of the MOP/RMP term are listed in Table 2-1.

Table 2-1
MPO Asset Register

Primary Domain	Size at Start of MOP/RMP term (ha)	Size at End of MOP/RMP term (ha)	Major Assets at End of MOP/RMP Term	Decommissioning Activities
Infrastructure Area	544	399	• Workshop and administration buildings and car park. • Sewage treatment plant. • Explosives magazine. • Coal handling areas and conveyors. • CHPP. • Rail loop and train-load out infrastructure. • Bengalla Link Road Bridge. • Electricity transmission line and phone services. • Fuel storage facilities. • Access and haul roads.	During the MOP/RMP term the redundant rail loop and train load-out infrastructure will be decommissioned and removed once the approved duplicated rail loop and train load-out infrastructure has been constructed. At the end of the mine life, all surface infrastructure will be decommissioned and removed (except where to be retained with approval of relevant regulatory authorities).
Fines Emplacement Area	83	83	• Pipelines, pumps and related fine rejects infrastructure. • The MPO Fines Emplacement Area. • Water diversions. • Access roads.	No decommissioning activities to be undertaken during MOP/RMP term. At the end of the mine life, all relevant infrastructure to be decommissioned and removed from the Fines Emplacement Area.
Water Management Areas	121	141	• Pipelines, pumps and related water management infrastructure. • Mine water and sedimentation dams. • Water diversions. • Access roads.	During the MOP/RMP term the water supply infrastructure located within the existing rail corridor will be decommissioned and removed once the new duplicated water supply infrastructure has been constructed. At the end of the mine life, the Mine Water Dam and some clean water diversions will remain in the final landform, with all other water supply infrastructure to be decommissioned and removed from the water management areas.
Active Void[1]	183	411	• Mining fleet. • Support equipment.	No active mining fleet will remain at the decommissioning phase.
Overburden Emplacement Area	223	101	• Overburden Emplacement mining fleet. • Support equipment.	No decommissioning activities to be undertaken during MOP/RMP term. At the end of the mine life, all plant and equipment will be dismantled, decommissioned and removed from the overburden emplacement area.

ha = hectares.

[1] Active void has been calculated based on the extent of the active open cut at the end of the MOP/RMP term.

2.3 ACTIVITIES OVER THE MOP/RMP TERM

The activities to be undertaken over the MOP/RMP term are summarised in Sections 2.4 to 2.10.

2.4 EXPLORATION

Prior to MACH Energy acquisition, the MPO coal resource was defined by a series of drilling programmes undertaken between 1992 and 2010. These programmes comprised of core drilling (31 per cent [%]) and open hole drilling (69 %). Coring was predominantly undertaken using a HQ3-sized bit (63 millimetres [mm]) and open hole drilling to an equivalent hole diameter size. A number of large diameter holes have also been drilled (200 mm).

A pre-production drilling program was completed in February 2018. The program was undertaken to increase geological confidence to support the commencement of production. As part of the program, a total of 151 boreholes were drilled in MLs 1645 and 1750. Drilling was undertaken using the water injection method, which generates minimal dust and noise emissions. The majority of boreholes were located within the open cut/overburden emplacement area footprint and involved open hole (non-core) drilling.

Subsequent drilling programs are scheduled to be undertaken during the MOP/RMP term within ML 1645 and ML 1709, and will generally be consistent with the approach undertaken in the pre-production drilling program (i.e. the drilling programs will lead the planned mining stages and will be located ahead of the advancing open cut/overburden emplacement area footprints and will involve open hole [non-core] drilling, using the water injection method). The drilling programs will be undertaken on an annual campaign basis throughout the MOP/RMP term to maintain an adequate knowledge of geology for the subsequent 3 years of mining. All necessary approvals (e.g. a Review of Environmental Factors, if required) will be obtained prior to commencement of the drilling programs.

2.5 CONSTRUCTION

The following sub-sections summarise the construction activities that are proposed to occur during the MOP/RMP term. These summary descriptions provide a provisional and general overview of the proposed construction works. These works will be subject to detailed design during the MOP/RMP term. Accordingly, the provisional designs described below may be subject to refinement.

2.5.1 Roads

Mine Service and Construction Roads and Haul Roads

Mine service and construction roads and major haul roads were largely constructed during the previous MOP/RMP term, including all required access roads, including:

- roads to existing sediment and environmental dams;
- ring roads around infrastructure (e.g. CHPP);
- roads to mine water dams;
- roads to the Fines Emplacement Area;
- roads to the explosive storages;
- roads to the open cuts and Overburden Emplacement; and
- the service road access under the relocated 66 kV line.

The mine service and construction roads will typically be service roads for light vehicles and construction plant only.

The infrastructure areas shown on Plan 2 include the existing mine service and construction roads and the existing major haul roads that connect the active mining areas with the MIA and the CHPP. Some minor amendments to the existing service roads and major haul roads (within the Infrastructure Area domain) will occur throughout the MOP/RMP term to accommodate development of the active mining area. A small access road will also be constructed during Year 1 of the MOP/RMP term adjacent to a clean water diversion to be installed west of the active mining area (Section 2.5.2 and Plan 3A).

MOD 4 Road Relocation and Overpass Works

As part of the MPO MOD 4 approval, a portion of Overton Road is approved to be relocated including a road overpass/bridge over the relocated rail spur (Figure 1-2). At the time of writing, construction of the road overpass/bridge and relocation of Overton Road is scheduled to occur during the MOP/RMP term. Implementation of these works would however be subject to detailed design. A summary description of the road relocation works, as provided in the MOD 4 EA (MACH Energy, 2017c) is provided below.

The new rail spur has been designed to incorporate rail or road overpasses for both Overton Road and Wybong Road to avoid the need for any new public road level crossings. In both cases, public road access would be maintained during construction.

Overton Road requires a minor road realignment in the north, due to a difference in topography, to facilitate a road bridge over the private rail cutting (Figure 1-2).

The realigned section of Overton Road would comprise a 6 metre (m) wide road with 1 m wide shoulders, and would incorporate a one lane rail spur overpass bridge (3 m lane and 0.5 m shoulders) to reconnect to Overton Road. It is noted that the new public road bridge would service one residential property and provide general ancillary access to Bengalla Mine land.

The realigned Overton Road would also connect with a new private access road to the east of the new road bridge and rail spur to connect Overton Road to the Overdene Homestead (Figure 1-2).

As shown on Figure 1-2, the above works are located outside the boundary of the MPO MLs. The works would be undertaken once all relevant approvals under the NSW *Roads Act, 1993* have been obtained.

In accordance with Condition 44I, Schedule 3 of Development Consent DA 92/97, MACH Energy will prepare a Construction Environmental Management Plan relevant to all MOD 4 construction works.

2.5.2 Water Management Infrastructure

Water management infrastructure will continue to be designed and constructed in accordance with the principles and guidelines outlined in the MPO Water Management Plan (WMP).

A number of dams have been constructed prior to the commencement of the MOP/RMP term, including:

- Environmental Dam 2 (ED2).
- Environmental Dam 3 (ED3).
- Environmental Dam Mine Infrastructure Area (EDMIA).
- CHPP Sediment Dam.
- Rail Loop Dam (RLD).

- High Wall Dam 1 (HWD1).
- Sediment Dams 1 and 3 (SD1 and SD3).
- Mine Water Dam (MWD).

The MWD will be the main water storage dam and will supply water for dust suppression and plant operation. Construction water (e.g. for dust suppression) may also be sourced from other dams and/or bores. Water would be transported around the site by various means, including, for example water carts and/or a network of pipelines.

MWD is located in the Dry Creek catchment upstream of Wybong Road and upstream of the Bengalla Mine's Clean Water Dam 1. Clean Water Dam 1 forms part of Bengalla Mine's diversion of Dry Creek. Clean water from the catchment south of MWD will continue to flow to Bengalla Mine's Clean Water Dam 1. Appropriate erosion and sediment controls have been established downstream of MWD. A clean water diversion has been constructed north of MWD during the previous MOP/RMP period. Site erosion and sediment controls are discussed further in Section 3.2.6.

Water collected in each of the dams will be used for dust suppression and fire protection requirements. Water needs will be supplemented by a pumped supply from the Hunter River via the existing Hunter River Pump Station and Pipeline, in accordance with MPO's licensing requirements.

During the MOP/RMP term, the following dams would be constructed: High Wall Dam 2 (HWD 2), Sediment Dam 4 (SD 4), and Clean Water Dam 4 (CWD 4).

Temporary water pipelines from dams ED2, ED3, EDMIA and HWD1 to the active mining area will be installed at the start of the MOP/RMP term to transfer water between the dams and to the active mining area. The temporary water pipelines would be laid on the ground surface and would avoid any trees and shrubs (i.e. no ground disturbance or vegetation clearance would occur) and would be primarily laid adjacent to existing access roads and within existing infrastructure areas. The temporary water pipelines would be approximately 400 mm in diameter and would be connected to existing pump systems at each dam. The water pipelines are anticipated to be removed by end 2019 or early 2020.

To further improve the separation of clean water from the catchment west of the active mining area, a clean water diversion will be installed during Year 1 of the MOP/RMP term from the north-western boundary of ML 1709 in a general south-west direction towards the existing infrastructure area (Plan 3A).

A number of groundwater monitoring bores would also be constructed throughout the MOP/RMP term to monitor and manage groundwater related impacts associated with operation of the MPO. MACH Energy would obtain all necessary DoI Water approvals and licences for the monitoring bores prior to construction. The monitoring bores would be broadly distributed across the project area and would augment the MPO's existing groundwater monitoring network. The bores would target all major hydrogeological units and would be constructed and operated in accordance with the relevant licence requirements. The MPO's Groundwater Management Plan would also be revised during the MOP/RMP to incorporate the revised groundwater monitoring network.

Construction of Relocated Water Supply Infrastructure

As part of the MPO MOD 4 approval, the Hunter River Pump Station and Pipeline will be relocated, east of ML 1750. The indicative location of the relocated Hunter River Pump Station and Pipeline is shown conceptually on Figure 1-2. The existing Hunter River Pump Station and Pipeline infrastructure will continue to be used until construction of the new infrastructure has been completed and commissioned. A summary description of the works, consistent with the indicative design described in the MOD 4 EA (MACH Energy, 2018), is provided below.

The new water supply pipeline will be constructed between the Hunter River and the MWD, a distance of approximately 6.4 km.

The pipeline would comprise a high-density polyethylene pipe, with a series of concrete pipe supports where above ground (approximately 3.4 km) or, alternatively, will be buried at a minimum depth of approximately 600 mm within the Hunter River floodplain (approximately 2.8 km). The pipeline diameter would be subject to detailed design but would nominally be between 650 mm and 850 mm in diameter.

The pump station would be supplied with electricity by a 22 kV electricity transmission line from the MPO substation (Figure 1-2). The main transfer pumps would nominally comprise two 400 kilowatt electrical 200 litres per second centrifugal pumps and associated electrical supply and enclosures/hardstands.

The pump station facility would largely be above ground; however, it would also include submerged pumps and a water inlet system adjacent to the Hunter River. The pump station would be designed and operated to minimise potential impacts on fish in the vicinity of the inlet (as described in Section 4.10.3 of the *Mount Pleasant Operation – Rail Modification Environmental Assessment* [MACH Energy, 2017c] (MOD 4 EA]).

The pump station facility would be located following detailed design and would comprise the pump infrastructure and noise attenuation enclosure (e.g. insulated cladding) on a concrete pad.

Removal of Existing Water Supply Infrastructure

As part of decommissioning of the existing rail spur, loop and associated rail infrastructure (refer Section 2.5.3), the existing Hunter River Pump Station and Pipeline infrastructure which is located adjacent to the existing rail infrastructure (Figure 1-2) will be decommissioned and removed during the MOP/RMP term.

2.5.3 Rail Infrastructure and Conveyor

Construction of Relocated Rail Infrastructure

During the MOP/RMP term, construction of the relocated rail spur, rail loop, train load-out facility and relocated product conveyor approved as part of MOD 4) will occur. The indicative location of the relocated rail infrastructure is shown conceptually on Figure 1-2. Construction of the rail overpass/bridge over Wybong Road (Figure 1-2) will also be undertaken during the MOP/RMP term.

The private rail spur construction will primarily comprise earthworks (i.e. cut and fill), provision of rail ballast (gravel material) to support rail sleepers, rail track, rail fixings and signalling.

Sections of the new rail spur would also require flood mitigation works (e.g. series of box culverts) and signalling/switching facilities (as described in Section 3.2.13 of the MOD 4 EA [MACH Energy, 2017c]).

Rapid construction of the rail spur and loop would be facilitated by splitting the construction task into two or three construction crews that would each work on different sections of the rail infrastructure in parallel.

Limited short-term truck haulage of some fill material along the corridor, or between the rail corridor and the MPO mining areas or temporary borrow pit areas within the MLs, may be required to manage the cut and fill materials balance or geotechnical requirements.

Decommissioning and Removal of Existing Rail Infrastructure

Decommissioning and removal of the existing rail spur and loop, existing train load-out facility and existing product conveyor will also occur during the MOP/RMP term (by the 31 October 2022 as required by Condition 37, Schedule 3 of Development Consent DA 92/97).

The interim stabilisation and temporary vegetation measures that would be implemented for the decommissioned rail loop and infrastructure corridor area, in accordance with Condition 55A, Schedule 3, of the Development Consent, are described in Section 7.2.5.

However, as provided for by Condition 55A, MACH Energy's obligations under Condition 55A will cease following the transfer or grant of a mining lease over that part of ML 1645, south of Wybong Road, to the operator of Bengalla Mine (or its nominee).

2.5.4 66 kV Power Line Relocation

During the MOP/RMP term, a 66 kV power line and associated infrastructure which currently runs south-west of ML 1709 will be relocated. The power line will be relocated to the north of its current position to accommodate the northern extension of the Overburden Emplacement.

2.6 MINING OPERATIONS

2.6.1 Mine Sequencing

Mining at the MPO has commenced in the south-east of the deposit and will gradually develop north and west over the mine life. Truck and excavator/shovel excavation will initially commence in a terrace mining sequence to reduce haul profiles, increase coal quality variability and reduce overall operating costs.

The anticipated progression of mining of the South Pit (towards the north and west) over the MOP/RMP term is shown conceptually on Plans 3A to 3E.

2.6.2 Overburden and Interburden Material

Overburden is the general name of the material that extends from below the topsoil layer to the upper coal seam. Interburden is the material that separates all subsequent coal seams. At the MPO, the overburden and interburden materials vary in physical and geochemical properties, in accordance with the geology of the area and the extent of exposure to weathering.

Mining during the MOP/RMP term will continue to utilise open pit surface mining methods, involving conventional truck and excavator/shovel excavation removing pre-strip and overburden sequences and coal seam interburden materials, hauling ex-pit and in-pit to overburden emplacements. Dozer push may also be utilised where practical.

Overburden and interburden material will continue to be primarily placed in the Eastern Out of Pit Overburden Emplacement during the MOP/RMP term as shown conceptually on Plans 3A to 3E.

To minimise the impact of the operation on Muswellbrook, night shift waste dumping will be on benches some 10 metres (m) below the top level of the eastern face of the Eastern Out of Pit Overburden Emplacement.

The surface topography at the MPO is undulating, with gullied areas that contain small amounts of unconsolidated deposits. Excavation will require removal of a thin topsoil layer (which will be stockpiled, refer Section 3.2.7), the area will then be prepared for drilling and blasting of the weathered layer of overburden. In some areas there may be small quantities of unconsolidated material that can be removed without blasting. These are likely to be small in area and exist in gully lines on the lower slopes.

Ground preparation for blasting will generally be required on the steeper slopes encountered at the MPO. This will be undertaken with large mine dozers. The dozers will be used to bench working pads that are suitable to maintain drill stability.

2.6.3 Coal Extraction

Coal will be extracted by either an excavator/hydraulic shovel or loader, depending on seam thickness and equipment scheduling requirements. A small percentage of coal seams may require ripping by dozers, or may be blasted. Extracted coal will be loaded onto a fleet of mine haul trucks for transport to the CHPP.

ROM coal will be trucked to a ROM dump hopper and transferred to the sizing station and stacker by conveyors. ROM coal may be temporarily stockpiled in the active mining area prior to being trucked to the ROM dump hopper.

During the MOP/RMP term, a temporary crushing facility located within the MIA will be used to crush bypass coal for rail transport. This will occur temporarily, to allow staged commissioning of elements of the CHPP. No trucking of the crushed coal product will occur (i.e. the crushed bypass coal will be transported via temporary and permanent conveyors and the approved rail loadout systems).

Due to the variable nature of the resource and variations in productivity on thick and thin seam sequences, excess ROM coal will be stockpiled in the CHPP area to maintain consistency in plant feed.

2.7 WASTE ROCK MANAGEMENT

2.7.1 Mining Overburden and Interburden

As described in Section 2.6.2 above, during the MOP/RMP term overburden will continue to be placed in an Overburden Emplacement to the east of the active mining area open cuts before eventually being placed behind the advancing open cuts (Plans 3A to 3E). As part of the planned routine mining operations, overburden will then also be placed behind the advancing mining operation to permit the extraction of coal. Overburden will generally be removed using truck and shovel methods.

As described in Sections 2.10 and 7.2.2, to facilitate the more rapid establishment of the final landform profiles, MACH Energy will generally construct the outer batters of the eastern face of the Overburden Emplacement in 10 metre (m) lifts that also facilitate the construction of more variable compound final landform slopes.

2.7.2 Fine Reject

During the previous MOP/RMP term, access roads to the Fines Emplacement Area, located within the western extent of the MPO area, were established and vegetation clearing was completed (Plan 2). Construction of the Fines Emplacement Area dam has been completed and deposition of fine rejects from the CHPP has commenced.

Deposition of fine rejects will continue within the Fines Emplacement Area (Plans3A to 3E) during the MOP/RMP term.

Fine reject (tailings) will be thickened into a solid's density of approximately 20% to 30% by weight and will predominantly be fine rock and clay with some coal and flocculent. The fine reject will be wet with moderate conductivity. Additional and/or alternate fine rejects processing technologies may also be undertaken during the MOP/RMP term, which may result in increased densities.

2.7.3 Coarse Reject

Coarse reject will consist predominantly of fine-grained sedimentary rock types with minimal quantities of carbonaceous material. Coarse reject contains no energy and is of no current commercial use, and has little propensity for spontaneous combustion. This material has similar properties to overburden material in contact with coal seams.

Coarse rejects will be placed within mined out void and Out-of-Pit Emplacements.

2.8 WASTE MANAGEMENT

2.8.1 Total Waste Management System

The approved MPO Waste Management Plan (WasteMP) describes the measures that will be implemented to avoid, minimise, reuse and recycle all waste streams generated during the construction and operation stages of the MPO.

Wastes generated on-site will be segregated at source and stored and transported appropriately. The segregation of wastes ensures different waste streams are appropriately managed based on their level of risk to the environment, and in accordance with any legal requirements. Segregation at source reduces the contamination of waste streams, improves the ease of storage, handling, disposal and tracking, and reduces the potential disposal costs for some items. Labelled and numbered bins will be provided at the point where wastes are produced to improve segregation.

There will be no landfill developed on-site, however, some inert waste material (e.g. wood, steel and wire from demolition) may be disposed of in the Overburden Emplacement, in accordance with the MPO WasteMP. Larger quantities of waste will be stored in secure locations on-site until they can be removed. Adequate containment, such as bunding, will be provided to prevent leaching from wastes onto the ground which could affect surface water quality or cause soil contamination. Wastes will also be managed to ensure that they are safe from likely ignition sources, and that the risk of fire is minimised. The disposal of tyres in the backfilled open cuts would be undertaken in accordance with the MPO's Waste Management Plan.

Regulated wastes as classified under Schedule 1 of the Protection of the Environment Operations *(Waste) Regulation 2005* will be managed in line with these regulations, ensuring compliance with tracking and recording requirements.

2.8.2 Sewage Waste

The MPO requires the construction of sewage management facilities. The ongoing design, construction and operation of these facilities will continue to comply with the conditions of the Development Consent, the requirements of MSC and any applicable legislation.

2.9 EXISTING INFRASTRUCTURE AND DECOMMISSIONING

Existing infrastructure constructed at the MPO by MACH Energy is outlined in Section 2.2.

As described in Section 2.5.3, the existing MPO rail spur, loop and train load-out infrastructure, and the adjacent water supply infrastructure, including Hunter River pump station and pipeline, will be decommissioned and removed during the MOP/RMP term.

In addition, as described in Section 2.5.4, the 66 kV power line (and associated infrastructure) which runs south-west of ML 1709 will be decommissioned and relocated during the MOP/RMP term. The power line will be relocated to the north of its current position to accommodate the northern extension of the Overburden Emplacement.

As part of ongoing general maintenance activities during the MOP/RMP term, a small (0.09 ha) area would be cleared around the existing site communications tower (located approximately 1 km north-west of the MWD) to facilitate/allow for ongoing maintenance works to be conducted safely around the tower. The Bengalla Infrastructure Area, while located within the southern portion of the MPO Development Consent boundary, is owned and operated by Bengalla Mine and does not form part of the MPO. This infrastructure area will not be decommissioned as part of the MPO and does not form a domain within this MPO/RMP. It has been identified solely because it falls within the Development Consent boundary.

Bengalla Mine's existing Clean Water Dam 1, which is located within the MPO Development Consent Boundary, will not be decommissioned in the MOP/RMP term.

2.10 PROGRESSIVE REHABILITATION AND COMPLETION

A detailed description of the rehabilitation activities proposed for the MOP/RMP term is provided in Section 7.2. A summary table of planned disturbance and rehabilitation over the MOP/RMP term is also provided in Section 7.2 (Table 7-3). Notwithstanding, a general overview of the progressive rehabilitation activities for the MOP/RMP term is provided below.

During the MOP/RMP term, the Eastern Out of Pit Overburden Emplacement will continue to be the focus of rehabilitation works at the MPO.

Rehabilitation will continue to involve dump profiling, contouring and topsoil placement on areas of the emplacement that have become available for rehabilitation (Plans 3A to 3E). Once areas become available for rehabilitation, dozers will be used to reshape the area before topsoiling, contouring and seeding takes place. Topsoil will be placed on the emplacement at a minimum depth of approximately 100 mm. Estimated volumes of topsoil used for rehabilitation during the MOP/RMP term are outlined in Table 3-9.

The preferential use of 10 m lifts of the Overburden Emplacement landform will result in more rapid establishment of the final surface levels. Using this approach, overburden placement progresses more rapidly than the alternative of construction in 20 m emplacement lifts. Lifts greater than 10 m may however be used on occasion, if the 10 m lifts result in material economic constraints.

MACH Energy anticipates initial rehabilitation of each subsequent dump panel lift being completed within six months (subject to delays associated with climatic extremes). Initial rehabilitation will include targeting reshaping to final surface level and sowing of a sterile cover crop on all outer batter lifts of the Eastern Out of Pit Emplacement.

The MPO rehabilitation strategy will focus on progressive rehabilitation to reduce the visual impact of operations on the town of Muswellbrook.

2.11 TEMPORARY REHABILIATION/STABILISATION

Temporary rehabilitation of temporary landforms (e.g. mine access roads etc.) or areas prone to dust generation, soil erosion and weed incursion that cannot be permanently rehabilitated, will continue to be undertaken across the MPO to minimise erosion and dust generation, in accordance with Condition 55, Schedule 3 of Development Consent DA 92/97.

Temporary rehabilitation measures may include hydromulching and/or seeding with sterile cover crop species, and would be undertaken within 6 months of the area becoming available. Vegetation species would be selected in consideration of *Managing Urban Stormwater – Soils and Construction Volume 1, 4th Edition* (Landcom, 2004). As described in Section 3.2.8, highly competitive exotic grasses (e.g. Rhodes Grass) and non-local Australian species (e.g. *Acacia saligna*) will not be used anywhere on-site.

Regular visual inspections (i.e. at least quarterly) of the temporary rehabilitation areas will be undertaken. These inspections will assess the stability of temporary rehabilitation landforms and the establishment of seeded areas. Initial replanting of losses and reseeding of failed areas will occur where necessary. An annual application of fertiliser and/or macro or micronutrients may also occur where required.

2.12 MATERIAL PRODUCTION SCHEDULE

The estimated Material Production Schedule for the MOP/RMP term is described in Table 2-2.

Table 2-2
Estimated Material Production Schedule

Material	Unit	Year 1 (1 July 2019 to 30 June 2020)	Year 2 (1 July 2020 to 30 June 2021)	Year 3 (1 July 2021 to 30 June 2022)	Year 4 (1 July 2022 to 30 June 2023)	Year 5 (1 July 2023 to 30 June 2024)	Total (1 July 2019 to 30 June 2024)
Stripped Topsoil	Mbcm	0.3	0.2	0.2	0.2	0.1	1.0
Rock/Overburden	Mbcm	22.8	22.6	22.6	27.1	35.0	130.2
ROM Coal	Mt	8.7	9.8	10.5	10.5	10.5	50.0
Reject Material	Mt	2.6	3.1	3.2	3.6	3.5	16.1
Product	Mt	6.1	6.7	7.3	6.9	7.0	34.0

Mbcm = million bank cubic metres.

Mt = million tonnes.

3 ENVIRONMENTAL ISSUES MANAGEMENT

3.1 ENVIRONMENTAL RISK ASSESSMENT

On 21 March 2019 MACH Energy undertook a risk assessment workshop to evaluate the risks associated with successful rehabilitation of the MPO, and the risks to biodiversity and land management, in accordance with MACH Energy's approved Rehabilitation Strategy. The risk assessment was facilitated by Mr Peter Standish of Operational Risk Mentoring Pty Ltd (ORM) and undertaken in accordance with the *AS ISO 13000:2018 Risk Management Guidelines*.

An overview of the risk assessment methodology and outcomes from the risk assessment are provided below.

The key risks associated with site rehabilitation, biodiversity and land management of the MPO have been assessed using the likelihood ratings, maximum reasonable consequence ratings, risk matrix and risk classifications listed in Table 3-1, Table 3-2, Table 3-3 and Table 3-4, respectively.

Table 3-1
Likelihood Ratings

Class	Likelihood	Likelihood Description	Frequency
A	Almost certain	Recurring event during the life – time of the operation/project.	Occurs more than twice per year
B	Likely	Event that may occur frequently during the life – time of an operation/project.	Typically occurs once or twice per year
C	Possible	Event that may occur during the life – time of an operation/project.	Typically occurs in 1-10 years
D	Unlikely	Event that is unlikely to occur during the life – time of an operation/project.	Typically occurs in 1-100 years
E	Rare	Event that is very unlikely to occur during the life – time of an operation/project.	Greater than 100 year event

Table 3-2
Maximum Reasonable Consequence Ratings

Class	Consequence	Environmental – On Site
1	Minor	Near source confined and promptly reversible impact.
2	Medium	Near source confined and short term reversible impact.
3	Serious	Near source confined and medium term recovery impact.
4	Major	Impact that is confined and requiring long-term recovery, leaving residual damage.
5	Catastrophic	Impact that is widespread-unconfined and requiring long–term recovery, leaving major residual damage (typically years).

Table 3-3
Risk Matrix

Likelihood	Consequence				
	1 – Minor	2 – Medium	3 – Serious	4 – Major	5 – Catastrophic
A – Almost Certain	Moderate	High	Critical	Critical	Critical
B – Likely	Moderate	High	High	Critical	Critical
C – Possible	Low	Moderate	High	Critical	Critical
D – Unlikely	Low	Low	Moderate	High	Critical
E – Rare	Low	Low	Moderate	High	High

Table 3-4
Risk Classification

Risk Class	Risk Management Response
Critical	Risks that significantly exceed the risk acceptance threshold and need urgent and immediate attention.
High	Risks that exceed the risk acceptance threshold and require proactive management. Includes risks for which proactive actions have been taken, but further risk reduction is impracticable. However active monitoring is required and the latter requires the sign-off from business unit senior management.
Moderate	Risks that lie on the risk acceptance threshold and require active monitoring. The implementation of additional measures could be used to reduce the risk further.
Low	Risks that are below the risk acceptance threshold and do not require active management. Certain risks could require additional monitoring.

Table 3-5 outlines the key identified risks and associated risk ratings for site rehabilitation, biodiversity and land management. The risk classification ratings reflect that the risks have been treated/addressed by the risk mitigation measures described in the Trigger Action Response Plan (TARP) provided in Table 9-1 in Section 9.2.

Table 3-5
Key Risks Associated with Site Rehabilitation, Biodiversity and Land Management

Risk	Likelihood Rating	Consequence Rating	Residual Risk Classification
Inappropriate bushfire management regime leading to impact on rehabilitated areas.	D	2	L
Major storm event resulting in flooding, geotechnical instability, major erosion and/or widespread damage to rehabilitated area.	D	3	M
Severe and/or prolonged drought leading to widespread failure of revegetation/rehabilitation.	D	3	M
Inadequate or insufficient topsoil to create/enhance the desired ecological communities in mine rehabilitation areas.	D	3	M
Inadequate weed and pest animal control leading to widespread failure of revegetation or continued sustainability of rehabilitation area ecosystems.	D	3	M

Table 3-5 (Continued)
Key Risks Associated with Site Rehabilitation, Biodiversity and Land Management

Risk	Likelihood Rating	Consequence Rating	Residual Risk Classification
Insect attacks (e.g. locusts and beetles) leading to failure of rehabilitation or continued sustainability of mine rehabilitation area ecosystems.	E	2	L
Inappropriate topsoiling, planting and/or direct seeding techniques resulting in a failure of rehabilitation.	D	2	L
Inappropriate fertiliser application (type and/or rate) leading to failure of revegetation or rehabilitation.	C	2	M
Frost leads to high mortality rates of revegetation and rehabilitation.	D	3	M
Incompatible neighbouring land owner practices (including interactions with the Bengalla Mine) leading to failure of rehabilitation and revegetation works.	C	2	M
Planning - insufficient provision of financial, human and equipment resources leading to failure to meet completion criteria, including increased maintenance costs and timeframe.	E	3	M
Inadequate or insufficient (incorrect species mix/quality) seed/seedlings for rehabilitation works.	D	3	M
Incorrect acid forming material management procedures results in rehabilitation failure and potential off-site water quality issues.	D	2	L
Inadequate erosion and sediment control leading to erosion and/or landform failure.	C	2	M
Not implementing rehabilitation activities in accordance with MPO rehabilitation requirements leading to inability to achieve landform and biodiversity goals.	C	2	M
Problems with species selection, environmental factors (e.g. drought), topsoil quality, seed quality, seeding/planting timing and/or predation by weeds or pests results in failure to achieve rehabilitation species/plant community requirements.	D	3	M

Consistent with the MOP Guidelines, the relevant mitigation or treatment measures developed for each of the key risks identified in Table 3-5 above are provided in the TARP in Section 9.2.

3.1.1 Environmental Management System

The approved Environmental Management System (EMS) for the MPO is designed to:

- effectively manage environmental issues;
- ensure compliance with regulatory requirements;
- continually improve environmental performance; and
- satisfy the expectations of stakeholders and the local community.

The EMS forms the basis of environmental management at the MPO and includes procedures, standards and management plans to ensure all regulatory requirements are met. The EMS will continue to operate during, and following, mine closure to ensure all environmental (including monitoring and management) and social responsibilities are met for up to five years after mine closure, or as approved by relevant regulators.

The Environmental Management Plans required for the MPO under Development Consent DA 92/97 are listed in Table 3-6.

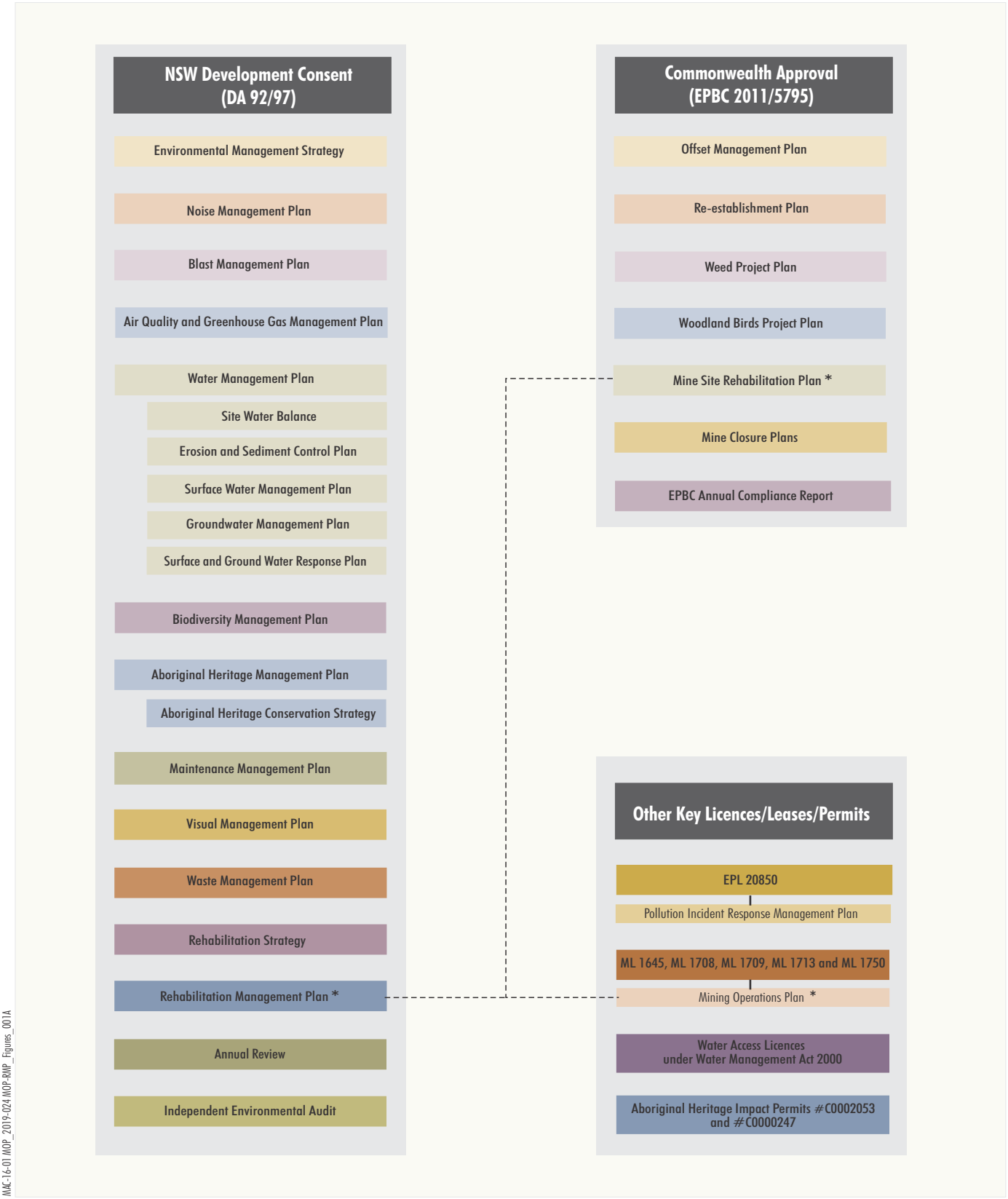
Table 3-6
MPO Management Plans

Plan	Relevant Development Consent DA 92/97 Condition
Noise Management Plan	Schedule 3, Condition 9
Air Quality and Greenhouse Gas Management Plan	Schedule 3, Condition 23
Aboriginal Heritage Management Plan (including Aboriginal Heritage Conservation Strategy)	Schedule 3, Condition 36
Water Management Plan (including Site Water Balance, Erosion and Sediment Control Plan, Surface Water Management Plan, Groundwater Management Plan and surface and Groundwater Response Plan)	Schedule 3, Condition 28
Blast Management Plan	Schedule 3, Condition 17
Visual Impact Management Plan	Schedule 3, Condition 47
Waste Management Plan	Schedule 3, Condition 52
Rehabilitation Management Plan (this document)	Schedule 3, Condition 56
Rehabilitation Strategy	Schedule 3, Condition 54
Biodiversity Management Plan	Schedule 3, Condition 32
Maintenance Management Plan	Schedule 3, Condition 41
Construction Environmental Management Plan (relevant to MOD 4 construction works)	Schedule 3, Condition 44l
Environmental Management Strategy	Schedule 5, Condition 1

In addition to the environmental management plans required under Development Consent DA 92/97, a number of management plans are required under the MPO's Commonwealth Approval EPBC 2011/5795. A summary of the MPO's environmental management system including the MPO's key approvals, licences, leases and permits and the MPO's environmental management plans is provided on Figure 3-1.

In addition to the statutory environmental management plans additional procedures and instructions associated with operational controls have been prepared and will be implemented, including:

- Environmental Compliance Register;
- Environmental Aspects and Impacts Register;
- Supervisors Induction;
- Ground Disturbance Permit Procedure;
- Ground Disturbance Permit Form;



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Notes:

* The Mining Operations Plan has been developed to meet the requirements for a Rehabilitation Management Plan (Condition 56, Schedule 3 of Development Consent [DA 92/97]). Following approval of the Mine Site Rehabilitation Plan (Conditions 19 and 20 of EPBC 2011/5795), the Mining Operations Plan and Rehabilitation Management Plan would be reviewed and revised if necessary.

MACHEnergy

MOUNT PLEASANT OPERATION

Environmental Management System
Structure Summary

Figure 3-1

- Ground Disturbance Toolbox Talk;
- Spontaneous Combustion Management Plan;
- Topsoil Stripping Management Plan;
- Topsoil Management Register;
- Bushfire Management Plan;
- Rehabilitation Procedure;
- Site Contamination and Prevention Control;
- Weed Control Work Instruction;
- Flora and Fauna procedure;
- Non-Routine Environmental Monitoring form; and
- Rehabilitation Record Form.

3.1.2 Environmental Reporting

An Annual Review is produced for the MPO to fulfil the reporting requirements of the Development Consent, and is provided to regulatory agencies and stakeholders. This report compiles monitoring results and discusses trends, system changes and responses to any potential issues identified during monitoring.

In accordance with Condition 11 of Schedule 5 of Development Consent DA 92/97, the MPO's Annual Review is provided on MACH Energy's website (www.machenergyaustralia.com.au). MPO reporting systems are further described in Section 10.1.

3.2 MANAGEMENT OF RISKS RELATING TO REHABILITATION

3.2.1 Geology and Geochemistry

Overburden and mine coal reserves will be removed at the MPO progressing north and west, with the overburden and interburden initially being placed in an Overburden Emplacement to the east of the open cuts before being placed behind the advancing open cuts.

Supplementary Report 1 of the 1997 EIS provides a description of the geochemical characterisation of the overburden and interburden materials that are present at the MPO. The sampling program associated with Supplementary Report 1 identified that some of the materials sampled produced leachate that is acidic, saline or sodic on weathering. These are characteristics that are known to produce adverse growing conditions for vegetative growth and an elevated risk of soil erosion and sedimentation, and need to be managed accordingly.

In order to understand the selective handling of materials, characterisation of soils and overburden will be undertaken throughout the development of the mine. Topsoil and subsoil characterisation will be undertaken in order to:

- identify any physical or chemical deficiencies or limiting factors (particularly alkalinity, salinity, dispersibility and sodicity) which may affect vegetation establishment, landform stability and propensity for spontaneous combustion; and
- develop selective placement strategies and/or develop suitable amelioration techniques.

Overburden characterisation is important for similar reasons, and more specifically to:

- identify material for use in the root zone, which is capable of supporting sustainable vegetation establishment;
- identify materials that limit plant growth or which may contaminate surface or ground water (e.g. salinity), and hence may require special handling, treatment or disposal; and
- identify any propensity for spontaneous combustion.

3.2.2 Material Prone to Spontaneous Combustion

Occurrences of spontaneous combustion are infrequent at the neighbouring Bengalla Mine due to the inert nature of the strata and proactive stockpile management. The environmental risk associated with spontaneous combustion at the Bengalla Mine has been assessed as low to moderate (Hansen Bailey, 2016). Therefore, it is anticipated that the risk of spontaneous combustion at the MPO will be low to moderate and can be managed using appropriate stockpiling practices.

Spontaneous combustion at the MPO will be managed in accordance with the following objectives:

- ensure that spontaneous combustion outbreaks are minimised;
- endeavour to identify potential areas that may be prone to spontaneous combustion before an outbreak occurs;
- provide for all carbonaceous material to be placed in such a manner that reduces the possible occurrence of spontaneous combustion;
- where longer term spontaneous combustion problems occur, instigate the Spontaneous Combustion Management Plan to deal with these; and
- creation of final rehabilitation that is free from spontaneous combustion.

3.2.3 Material Prone to Generating Acid Mine Drainage

Geochemical characteristics of the overburden material were tested by the Department of Mineral Resources Development Laboratory (Mountford and Wall, 1995). The only acid forming leachate occurred in samples obtained from the Wynn Seam. Material balance calculations undertaken for the 1997 EIS indicated that dilution and neutralisation will negate any acid forming potential.

Therefore, due to the predicted small proportion of potentially acid forming material, it is expected that operational blending during ROM dumping will produce a non-acid forming material within the Overburden Emplacement and back-filled open cuts. The management strategy for the MPO will provide that no zones of poorly blended, potentially acid forming material are exposed in the final surface of the Overburden Emplacement and back-filled open cuts. This will be achieved by excluding the material identified as potentially being acid forming (i.e. non-economic coal and identified coal seam roof and floor rock from the Wynn Seam) from the final face of the Overburden Emplacement with a minimum cover of 10 m of inert material overlying the potentially acid forming material.

Locations of potentially acid forming materials have been identified on-site. The mine plan includes sequencing of mining and emplacing of potentially acid forming material to ensure the material is separated from non-acid forming material. Potentially acid forming material will be emplaced on the Overburden Emplacement away from gullies and drainage lines, and away from the outer slopes. Where possible, potentially acid forming material will be emplaced in-pit.

3.2.4 Mine Subsidence

No subsidence impacts will occur as a result of the operations planned at the MPO, as mining operations are open cut. Minor historical underground workings exist on the northern and southern parts of ML 1645, and parts of ML 1750.

3.2.5 Voids, Highwalls and Endwalls – Slope Management

The final void, lowwalls and ramps cannot be rehabilitated progressively over the mine life as they are required up to the end of production for accessing coal and related infrastructure services. All areas of the site, with the exception of the final voids and their surrounding catchments, will be free draining. This will allow effective catchment contribution and yield to the Hunter River, following the cessation of mining.

The final void landform will be rehabilitated with vegetation species and diversity that are appropriate for the complex landform. The highwall will also be rehabilitated using the best reasonable and feasible rehabilitation technologies available and re-vegetated with species that are appropriate for its steepness and aspect.

Design alternatives for the final void will be continually evaluated and will be prepared as part of the closure planning process at the MPO. Regardless of the final design alternative selected, the location of the final void will be outside the 100-year recurrence interval flood prone area of the Hunter River. Appropriate measures will be used to limit access to steep areas around the final void to restrict cattle, pedestrian and vehicle access. These measures may include large rock placement, landform shaping, or fencing, as agreed with relevant government authorities prior to closure.

3.2.6 Erosion and Sediment Control

An Erosion and Sediment Control Plan (ESCP) has been developed in accordance with Condition 28(b), Schedule 3 of Development Consent DA 92/97. The ESCP is included in Appendix A of the MPO WMP. The ESCP describes the management of potential erosion impacts as well as implementation of a monitoring program to provide early detection of potential issues and to monitor the effectiveness of controls. A detailed construction ESCP has also been prepared to meet internal MACH Energy planning requirements.

In order to reduce the potential for degradation within the MPO area and adjoining lands, there are two zones of focus that will be adequately managed during the construction phase:

- areas disturbed by construction and initial mining activities; and
- undisturbed areas.

The following measures will be adhered to in all areas of the site where disturbance from construction and/or initial mining activities occurs:

- relevant internal approvals and permits will be obtained before commencement of surface disturbance in the construction stage (e.g. Ground Disturbance Permits);
- the extent of disturbance (including trafficable areas) will be minimised and identified using appropriate pegging, barriers or signage;
- appropriate erosion and sediment controls will be approved and established prior to land disturbance and will remain in place until exposed areas are stabilised;
- clean water runoff from undisturbed catchments will be diverted around the disturbance areas via diversion drains and banks to discharge into natural watercourses, where practical;

- runoff from disturbed areas will be diverted into sediment dams;
- drains, diversion banks and channels will be stabilised and scour protection will be provided as necessary;
- temporary erosion and sediment control measures will be used on-site and may include silt fences, hay bales, jute mesh, check dams, cross banks, contour banks, armouring and straw mulching; and
- topsoil will be stockpiled for reuse and all stockpiles will be managed as described in Section 3.2.7.

Drainage considerations will be incorporated into the landform design plan to slow and direct water flow and minimise erosion. Diversion drains will be constructed as per the design plans.

3.2.7 Soil Types and Suitability

Soil management is fundamental in successful land management and rehabilitation of the MPO. The key objectives for managing the soil landscape (in context of vegetative cover and soil stability) include:

- minimising bare soil patches which could potentially be affected by wind and water movement; and
- favourable nutrient, infiltration and stability characteristics.

Data derived from the 1997 EIS demonstrates the suitability of the soils of the MPO area for use as growing media and the stripping depth. Table 3-7 summarises the soil types across the MPO area and their characteristics.

Table 3-7
Summary of Soil Types

Soil Types	Characteristics
Alluvial – Floodplain Soils	Uniform medium or fine textured clay profile, consisting of clay loams, silty clay loam or light clay topsoils. Slightly to highly dispersive.
Drainage Flat/Drainage Line Soils	Brown solonised soils and brown and yellow solidic soils. Slightly dispersible topsoils and highly dispersible subsoils.
Hillslope Soils	Topsoils are stable though occasionally highly dispersible. Subsoils are highly dispersible.
Sandy Hillslope Soils	Sandy parent material. Topsoil in two layers: • Light sandy clay loam, loam fine sandy or fine sandy clay loam. • Clayey sand, sandy loam or light to fine sandy clay loam. Subsoil is sandy to light medium clay – slightly to highly dispersible.
Volcanic Hillslope Soils	Uniform structured clay soils. Topsoil is fine sandy clay loam or light clay. Subsoils consist of silty to light medium clays. Slight to moderate dispersibility.

Source: ERM Mitchell McCotter (1997).

The suitability of these soils for rehabilitation use, and their stripping depth, is summarised in Table 3-8.

Table 3-8
Summary of Soil Suitability for Use in Rehabilitation

Soil Unit Type	Suitable Stripping Depth
Alluvial Soils	Approximately the top 0.5 m of this soil unit is suitable for topsoil, while all remaining material down to at least 2.5 m is suitable for subsoil.
Drainage Flat/Drainage Line Soils	Surface layer is suitable for topsoils. Stripping depth to 0.2 m – though this is dependent on site specific soil characteristics. Soil below these layers is unsuitable due to unsuitable pH, dispersion characteristics, and structure.
Hillslope Soils	Surface soil material can be stripped down to a pale coloured (A2) horizon or in places down to a brighter coloured subsoil clay layer.
Sandy Hillslope Soils	Surface layers are only suitable for topsoil, usually to a depth of 0.1 m. Some areas not suitable due to high sand, gravel content or sandy texture.
Volcanic Hillslope Soils	Topsoil suitable to depths of 0.2 m. Some areas not suited due to shallow soils or high content of gravel or rock.

Source: ERM Mitchell McCotter (1997).

Topsoil Stripping

Topsoil stripping activities will be undertaken in accordance with the ESCP, to minimise erosion potential.

Topsoil will be stripped and salvaged to maximise its value for re-use in rehabilitation, this process will be guided by soil mapping and the suitable soil stripping depths described in Table 3-8. The areas cleared in advance of mining will be minimised to reduce air quality impacts and potential impacts to fauna. Where practicable, soil will be stripped when moist (but not saturated).

Topsoil Budgeting

Rehabilitation planned during this MOP/RMP term is described in Section 7.2. A detailed estimated topsoil budget for the MOP/RMP term is provided in Table 3-9.

Topsoil is collected and stored on-site with an aim to stockpile sufficient topsoil to rehabilitate the entire final landform. MACH Energy currently estimates that 1,431,000 cubic metres (m^3) of topsoil is required for final landform rehabilitation and therefore, MACH Energy is aiming to stockpile this amount prior to mine closure.

Topsoil Management

Where possible, topsoil will be transported directly to areas available for rehabilitation. Where this is not possible, topsoil stockpiles will be established separate to subsoil stockpiles and away from active transport corridors. The stockpiles will be managed to maintain seed reserves and microbial soil associations. Topsoil stockpile management options, which may be undertaken where necessary, are summarised in Table 3-10.

Table 3-9
Estimated Topsoil Budget

Topsoil Budget	Year 1 (1 July 2019 to 30 June 2020)	Year 2 (1 July 2020 to 30 June 2021)	Year 3 (1 July 2021 to 30 June 2022)	Year 4 (1 July 2022 to 30 June 2023)	Year 5 (1 July 2023 to 30 June 2024)	Total (1 July 2019 to 30 June 2024)
Topsoil stockpiled at start of MOP/RMP term (m^3)	850,000	1,089,395	1,208,941	1,351,298	1,531,096	850,000
Stripped Topsoil during MOP/RMP term (m^3)	278,591	194,448	208,750	198,798	128,811	1,009,397
Topsoil used for Rehabilitation during MOP/RMP term (m^3)	39,196	74,902	66,393	18,999	27,505	226,995
Topsoil stockpiled at end of MOP/RMP term (m^3)	1,089,395	1,208,941	1,351,298	1,531,096	1,632,402	1,632,402

m^3 = cubic metre.

Table 3-10
Topsoil Management Options

During Soil Stripping and Stockpiling	Stockpiled Soil Awaiting Use in Rehabilitation Works	During the Rehabilitation Program
• Minimisation of vegetation clearance. • Selective stockpiling of soil according to pre-disturbance vegetation communities, soil type and salinity. • Stockpiling of soils in a manner that does not compromise the long-term viability of the soil resource. • Vehicle movement will be kept to a minimum on the soils to be stripped. Traffic will be excluded from soils that are sensitive to structural degradation. • Construction of stockpiles with a "rough" surface condition to reduce erosion hazard, improve drainage and promote revegetation. • Stockpile heights will be managed in order to minimise problems with anaerobic conditions. Construction of topsoil stockpiles will target a maximum height of 2 m. Where this is not practicable due to spatial constraints, topsoil stockpiles will generally be limited to a height of approximately 3 m. Subsoil stockpiles (including alluvial soil stockpiles) will be limited to between approximately 3 m to 5 m in height.	• Implementation of measures to provide for long-term viability of soil resources. • Stockpiles that are to remain inactive for extended periods are to be fertilised if required and seeded with appropriate seed mix to maintain soil structure, organic matter and microbial activity (stockpiles will be shaped prior to seeding). • Installation of silt fences around stockpiles to control potential loss of stockpiled soil through erosion prior to vegetative stabilisation. • Stockpiles may be deep-ripped to establish aerobic conditions, prior to reapplication of stockpiled soil for rehabilitation. • Where necessary, an appropriate soil ameliorant will be applied to dispersive soil stockpiles. • Implement appropriate weed control strategies, particularly for any priority weeds, or plants identified as Key Threatening processes. Immediate revegetation will provide vegetative competition to assist with control of undesirable plant species. • Stockpiles will be appropriately sign-posted to identify the area, the source of the soil (i.e. native vegetation community or pasture), the date of stockpile establishment and to minimise the potential for unauthorised use or disturbance. • Topsoil stockpiles will be located away from mining, traffic areas and watercourses. • Level or gently sloping areas where available will be selected as stockpile sites to minimise erosion and potential soil loss.	• Topsoil conditioning involving the addition of lime, gypsum or fertiliser will be used where required. • Soil ameliorants such as gypsum, wood and hay mulch, biosolids, municipal waste composts and other organic wastes are utilised based on availability of supply and are incorporated by ripping, plough or rotating hoe. The use of soil ameliorants is designed to prevent surface crusting, increase moisture and organic content, and buffer surface temperatures to improve germination. • Compacted soil is ripped to a depth of 30 centimetres (cm) along the contour prior to the application of topsoil and rock raking. • Topsoil will not be respread when wet, to avoid excessive compaction. • At all times, topsoil respreading must be undertaken so that dust is managed. • Where possible, topsoil is dumped at the top of the slope and spread down slope to a minimum depth of 10 cm. • Topsoil is to be used where available to promote species recruitment from direct soil return. • All contractor machinery used to handle and transport topsoil are to be cleaned down both prior to and at the completion of works to minimise the risk of transfer of weeds. • On completion of landform contouring, topsoiling and erosion and sediment control works, a vegetative cover will be applied as soon as practicable. Depending on the proposed post-mining landuse, this will involve direct seeding of selected shrub, grass and tree species.

3.2.8 Flora and Fauna

The floristics and vegetation structure across the site and the surrounding areas have been extensively modified since European settlement. Grassland is the most common vegetation community on the site (Plan 1B-1) and is used for beef cattle grazing (Plan 1B-2). Other than grassland, the landscape includes scattered patches of open woodland of various sizes, ages and condition (Plan 1B-1).

The impacts of the MPO on biodiversity are summarised in the 1997 EIS, the MOD 1 to MOD 4 environmental assessments, and in the MPO's Biodiversity Management Plan.

Updated vegetation mapping of the MPO area (Plan 1B-1) was undertaken by Hunter Eco in 2018 (Hunter Eco, 2018), following approval of MOD 3. This mapping was undertaken in order to align vegetation communities with contemporary Plant Community Type (PCT) definitions, as well as to inform target woodland ecosystems and species selection for rehabilitation. The updated vegetation mapping has been supplemented in areas by earlier vegetation mapping, undertaken by Cumberland Ecology in 2010 (Cumberland Ecology, 2010).

The vegetation communities presented on Plan 1B-1 have been reconciled against contemporary PCT definitions in Table 3-11.

Table 3-11
Vegetation Community/Plant Community Type Reconciliation

Vegetation Community Name (Plan 1B-1)	PCT	PCT Name
White Box – Narrow-leaved Ironbark – Blakely's Red Gum[1]	1606	White Box – Narrow leaved Ironbark – Blakely's Red Gum shrubby open forest of the central and upper Hunter.
Spotted Gum – Narrow-leaved Ironbark Woodland[1]	1602	Spotted Gum – Narrow-leaved Ironbark shrub – grass open forest of the central and lower Hunter.
Spotted Gum – Grey Box x White Box Woodland/Forest[1]	1604	Narrow-leaved Ironbark – Grey Box – Spotted Gum shrub – grass woodland of the central and lower Hunter.
Slaty Box Woodland (DNG)	1655	Grey Box – Slaty Box shrub – grass woodland on sandstone slopes of the upper Hunter and Sydney Basin.
Narrow-leaved Ironbark – Grey Box Grassy Woodland[1]	1691	Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter.
Narrow-leaved Ironbark Shrubby Forest[1]	1605	Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter.
Grey Box x White Box Grassy Woodland[1]	483	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley.
Forest Red Gum Grassy Open Forest[1]	618	White Box x Grey Box – Red Gum – Rough-barked Apple grassy woodland on rich soils on hills in the upper Hunter Valley.

Source: OEH (2018) *Bionet Vegetation Classification*. Accessed 31 October 2018. https://www.environment.nsw.gov.au/NSWVCA20PRapp/search/pctsearch.aspx
Note: DNG = Derived Native Grassland.
[1] Including the DNG component of the vegetation community.

Analysis of this vegetation mapping indicates that the most widespread PCTs being disturbed by the MPO are the following:

- PCT 483 - Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley (represent White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community).

- PCT 1604 - Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter.
- PCT 1605 - Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter.

The eastern face of the final landform will be targeted for revegetation using the species characteristic of these PCTs as conceptually shown on Plan 4A (i.e. Domain D – Native Woodland/Grassland). These PCTs are proposed to provide potential habitat (in the long-term) for threatened flora and fauna that have been previously recorded in the area, including:

- Woodland birds:
  - Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*).
  - Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*).
  - Speckled Warbler (*Chthonicola sagittata*).
  - Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*).
  - Diamond Firetail (*Stagonopleura guttata*).
  - Varied Sittella (*Daphoenositta chrysoptera*).
- Mammals:
  - Squirrel Glider (*Petaurus norfolcensis*).
  - Spotted-tailed Quoll (*Dasyurus maculatus*).
  - Eastern Freetail-bat (*Mormopterus norfolkensis*).
  - Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*).
  - Eastern Bentwing-Bat (*Miniopterus schreibersii oceanensis*).
  - Grey-headed Flying-fox (*Pteropus poliocephalus*).
  - Eastern False Pipistrelle (*Falsistrellus tasmaniensis*).
  - Southern Myotis (*Myotis macropus*).
  - Greater Broad-nosed Bat (*Scoteanax rueppellii*).
  - Eastern Cave Bat (*Vespadelus troughtoni*).
- Flora:
  - Tiger Orchid (*Cymbidium canaliculatum*) – Endangered Population in the Hunter Catchment.

A summary of the PCT communities targeted for revegetation and associated upper, middle and ground stratum species is provided in Table 7-1 in Section 7.2.3. It is anticipated that the list of PCTs will be further augmented and refined over the life of the MPO based on the results of on-site investigations, on-site rehabilitation trials and consultation with key stakeholders.

Flora and Fauna Management Strategies

A Vegetation Clearance Protocol (VCP) will be implemented at the MPO to minimise impacts on threatened species during native vegetation clearing at the MPO. The VCP is described in detail in the MPO's Biodiversity Management Plan.

The VCP includes the following components:

- Delineation of disturbance areas.

- Pre-clearing procedures, including:
  - a Ground Disturbance Permit process;
  - Pre-clearance Surveys; and
  - salvaging of habitat features for re-use in native vegetation rehabilitation areas.

Pre-clearing surveys will be undertaken (in conjunction with the ground disturbance permit process) to identify potential habitat features (and active threatened fauna) prior to commencing clearing works in any given area and determining appropriate management (i.e. depending on the habitat feature or threatened species identified). The pre-clearance survey would also target the identification of weed infestations that may need treatment prior to, or during disturbance, and/or pest species that may require control prior to disturbance. The pre-clearance survey will be conducted by an appropriately trained and suitably qualified ecologist. Further details of the VCP are provided in the Biodiversity Management Plan.

Management actions for identified potential habitat features or active threatened fauna will be determined on a case by case basis, but may include selective clearing of non-habitat features/vegetation to encourage self relocation. Where necessary, an appropriately trained and suitably qualified ecologist will be used to attempt removal of remaining fauna from the area should they not leave of their own accord.

As part of the mine plan, vegetation clearing and topsoil stripping activities will be undertaken throughout the year, however, they may be undertaken on a campaign basis.

Proposed use of felled timber will follow current leading practice and may include salvaging habitat features such as hollows, harvesting of brush material that is laden with fruit/seed, mulching and incorporating understorey and saplings into stripped topsoil, collection of timber for fencing, the installation of stag trees and respreading coarse timber residue onto re-contoured land.

Rehabilitation of woodland will focus on flora species endemic to the local area, while acknowledging that seed supply may be a limiting factor. In this case, other appropriate native species that have performed well in the region will also be considered. Based on seed supply and suitability, flora species to be used in rehabilitation may also include those typical of the NSW listed *White Box Yellow Box Blakely's Red Gum Woodland* endangered ecological community.

The rehabilitation program at the MPO will focus on research and management practices that are designed to enhance rehabilitation success. As described in Sections 3.2.1 and 3.3.1, overburden material management and soil management at the MPO will include material characterisation and selective placement strategies to manage materials (e.g. saline, acidic and sodic materials) that may affect native ecosystem re-establishment. Exotic grass species may also be used to provide early groundcover while native woodland species develop. Highly competitive exotic grasses (e.g. Rhodes Grass) and non-local Australian species (e.g. *Acacia saligna*) will not be used anywhere on-site. Use of exotic grass species would be undertaken in consultation with a suitably qualified ecologist/specialist.

Where relevant, management practices described in the *National Recovery Plan – White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Department of Environment, Climate Change and Water [DECCW], 2011) (i.e. community equivalent to the NSW White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community) will be used as the basis for the re-establishment of Grassy Woodland areas on-site. This plan has been considered in the development of the completion criteria and performance indicators for Ecosystem and Land Use Establishment and Ecosystem and Land Use Sustainability for the Native Woodland/Grassland Domain areas (Domain D) as described in Section 6.

Further detail regarding reinstating native woodland ecosystems for threatened flora and fauna is provide in Section 7.2.3.

Details pertaining to the management of visual screens at the MPO are provided in the Visual Impact Management Plan (VIMP).

3.2.9 Weeds and Pest Species

The key weed and pest species on the MPO landscape include: African Boxthorn (*Lycium Ferocissimum*); St John's Wort (*Hypericum perforatum*); feral dogs; foxes; and feral pigs. Ongoing management activities are undertaken to control the presence of these species.

Weed management at the MPO will be undertaken in accordance with advice from the Upper Hunter Weeds Authority, and in accordance with the *Biosecurity Act 2015*. The MPO also has a weed management procedure which will be implemented across the MPO area. The procedure includes a description of the Weeds of National Significance, priority and environmental weed species which pose a threat to the site. Monitoring of weed presence, extent and other factors which may contribute to growth/decline of populations will occur regularly.

As described in the Biodiversity Management Plan, weed management measures that may be undertaken at the MPO include (but are not limited to):

- Regular inspections of MACH Energy-owned lands to identify areas requiring the implementation of weed management measures.
- Regular inspections and maintenance of topsoil stockpiles.
- Management of cattle movement to mitigate the risks associated with the control of weeds in manure, around stockyards, and key access corridors.
- Consultation with neighbouring land owners and the relevant government stakeholders, such as the Upper Hunter Weeds Authority, regarding regional weed management strategies.
- Implementation of appropriate weed management measures, which may include mechanical removal, application of approved herbicides and biological control.
- Control of noxious weeds, or plants identified as key threatening processes on MACH Energy-owned land in accordance with the relevant DPI control category and the regional Weed Management Plan.
- Identification of weed infestations adjacent to or within the proposed disturbance area during pre-clearance surveys.
- Follow-up inspections to assess the effectiveness of the weed management measures implemented and the requirement for any additional management measures.

The outcomes of these weed and pest management activities will be reported in the Annual Review (Section 10.1).

3.3 MANAGEMENT OF OTHER ENVIRONMENTAL RISKS

3.3.1 Overburden Characterisation

The geochemical characteristics relevant to waste rock are discussed in Section 3.2.1.

3.3.2 Slopes and Slope Management

The design and management of the highwalls, endwalls and final void are described in Section 3.2.5.

The slope design of the outer batters of the Overburden Emplacement is addressed in Sections 3.3.2 and 7.2.2.

3.3.3 Air Quality

Air quality management and monitoring will be conducted in accordance with the Air Quality and Greenhouse Gas Management Plan.

Air quality monitoring results will be documented in the Annual Review.

3.3.4 Surface Water

A WMP has been developed in accordance with Condition 28(c) of Development Consent DA 92/97. The WMP includes information on surface water management and erosion and sediment control requirements.

The MPO site water management system generally aims to separate clean water from water that has been in contact with coal.

The WMP includes details of MPO's requirements under the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* which regulates the releases of saline water during periods of high flow in the Hunter River such that specific salinity targets at various points in the river are not exceeded.

3.3.5 Groundwater

Potential impacts on groundwater are managed in accordance with the Groundwater Management Plan, developed in accordance with Condition 28(d) of Development Consent DA 92/97.

3.3.6 Contaminated Land

Land contamination is managed through the MPO site contamination prevention and control procedure and non-mineral waste management procedures.

Prior to the cessation of mining activities, an assessment will be undertaken to determine whether potential contamination issues exist and remediation is required. Issues expected to be addressed by this assessment will include, but not be limited to, decontamination of areas such as those impacted by carbonaceous material (e.g. coal spillage, coal storage), by hydrocarbon spillage (e.g. workshops, fuel storage areas) or by sedimentation (e.g. dams that have directly received pit water).

3.3.7 Hazardous Materials

Hazardous substances will be managed through the MPO Environmental Management System procedures for site contamination prevention and control. Additionally, the MPO will register all chemicals used on-site in a central database. The central database will contain all information in the Safety Data Sheets (SDS) and an inventory of chemicals held on-site. The information will be accessible at any computer terminal within the MPO, and will provide guidance on storage, use and disposal.

Hazardous and explosive materials will be transported and stored on-site in accordance with the NSW *Work Health and Safety Act 2011* and supporting *Work Health and Safety Regulation 2017,* the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and the supporting *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014,* as well as the NSW *Explosives Act 2003* and supporting *Explosives Regulation 2013*.

The procedures and controls will minimise the potential for land and water contamination from the handling, storage and disposal of hazardous substances. These controls will include storage within properly sealed containers and controlled areas, and bunding areas used for medium to long-term storage requirements. These storage and waste receival areas will be isolated from clean water catchments to minimise the risk of land or water pollution should an unplanned spill occur.

The response to any accidental spills or ground contamination will be assessed on a case-by-case basis, and remediated using biodegradable spill absorbent, and in accordance with any requirements of the SDS for the material. Emergency response procedures will also be enacted as required in accordance with the relevant environmental procedures. Hydrocarbon or chemical spills will also be reported in the mine site incident reporting and management system with corrective and preventative measures taken as appropriate, in accordance with the MPO's Pollution Incident Response Management Plan.

Hydrocarbon spills will be managed using bioremediation of the contaminated soils within a bioremediation facility located adjacent the open cut pit, or taken offsite for bioremediation at an appropriate facility. Following a spill, the contaminated soil is transported to the facility (generally via loader) and the details of the incident are recorded in the MPO Bioremediation Tracking Spreadsheet. Routine testing is undertaken on contaminated soils stored within the facility, until the soils reach a level where they are deemed safe for storage. The soils are then disposed of in-pit (with placement to target areas as low in the pit as possible).

Notwithstanding the above, the treatment of hydrocarbon spills is assessed on a case-by-case basis and is dependent upon the nature and scale of the spill. Should bioremediation not be an appropriate treatment for a spill, other options may include land farming (in accordance with the EPA's *Best Practice Note: Landfarming* [EPA, 2014]) or transporting the contaminated soils off-site for treatment at a treatment facility.

3.3.8 Greenhouse Gases, Methane Drainage and Venting

In accordance with Condition 19, Schedule 3 of Development Consent DA 92/97, MACH Energy implements all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site. These measures are detailed in the Air Quality and Greenhouse Gas Management Plan.

Methane drainage and venting is not applicable to the MPO.

3.3.9 Acid Mine Drainage

The management of material prone to generating acid mine drainage is described in Section 3.2.3.

3.3.10 Blasting

Blasting activities commenced in late 2017, and have been undertaken in accordance with the approved Blast Management Plan, prepared in accordance with Condition 17, Schedule 3 of Development Consent DA 92/97.

Blast monitoring results are documented in the Annual Review.

3.3.11 Noise

Noise management and monitoring will be conducted in accordance with the Noise Management Plan.

Noise monitoring results are documented in the Annual Review.

3.3.12 Visual and Lighting

Visual amenity at the MPO will be managed in accordance with the VIMP, which includes details of the measures that will be implemented at the MPO to address potential visual impacts that may affect local and regional visual receptors.

3.3.13 Heritage

Aboriginal Cultural Heritage

Aboriginal archaeology and cultural heritage at the MPO is managed in accordance with AHIP #C0002053 and AHIP #C0002092 and the MPO's AHMP. All works described in this MOP/RMP will be undertaken in accordance with these AHIPs and the AHMP.

Consultation with the Aboriginal community in relation to the management of Aboriginal archaeology and cultural heritage at the MPO is undertaken through the Aboriginal Heritage Management Plan, conditions within Development Consent DA 92/97, the *NSW National Parks and Wildlife Regulation, 2009* and the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010).

Historic Heritage

In 2014, detailed recording of historic heritage sites on the MPO MLs was undertaken and, where warranted, specific archaeological management measures for specific sites were developed. Where appropriate, these works will be conducted with the participation of interested community members, such as representatives from local historical societies.

3.3.14 Spontaneous Combustion

The management of material prone to spontaneous combustion is described in Section 3.2.2.

3.3.15 Bushfire Management

The main objectives of bushfire management are to minimise the risk of bushfires and to rapidly control any outbreaks that might occur. Control measures are in place to protect people, property, assets, places of heritage value, threatened flora and fauna and to minimise the potential spreading of bushfires in and around the MPO.

The control measures implemented to prevent and manage bushfires focus on minimising the amount of fuel available at the MPO and its surrounding land. These measures include:

- slashing of vegetation along roads and internal tracks which are used as fire trails and assist in dividing the site into control zones;
- the use of livestock to reduce pasture-based fuel loads on land suitable for grazing; and
- a network of water supply points to assist the NSW Rural Fire Service (RFS) with logistical support.

In the event of a bushfire at the MPO, the MPO's Bushfire Management Plan and emergency response procedures will be enacted.

4 POST-MINING LAND USE

4.1 REGULATORY REQUIREMENTS

Regulatory requirements relevant to post-mining land use and rehabilitation at the MPO are provided in the following MPO approval documents:

- Development Consent DA 92/97;
- the MPO's MLs; and
- EPBC Approval 2011/5795.

The Development Consent and ML Authority conditions relevant to post-mining land use and rehabilitation are detailed and reproduced in full in Table 1-1 in Section 1.1. Table 1-1 includes section references to where the Development Consent and ML conditions are addressed in this MOP/RMP.

The requirements of EPBC Approval 2011/5795 relevant to post-mining land use and on-site rehabilitation include the following:

EPBC Approval 2011/5795 Condition 19

> *The person undertaking the action must, within 3 years of the commencement of construction, submit to the Minister for approval a Mine Site Rehabilitation Plan for the progressive rehabilitation and revegetation of no less than 1000 ha of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and derived Native Grassland Ecological Community on the project area (as identified in Appendix A).*

MACH Energy commenced construction of the Action associated with EPBC Approval 2011/5795 on 25 November 2016. Accordingly, MACH Energy will submit a Mine Site Rehabilitation Plan to the DEE by 25 November 2019. Following approval of the Mine Site Rehabilitation Plan, this MOP/RMP will be reviewed and revised if necessary.

EPBC Approval 2011/5795 Condition 21

> *The person undertaking the action must submit to the Minister for approval the Mine Closure Plans, at least 6 months prior to the mine closure. The approved Plan must be implemented.*

In accordance with Condition 21 of EPBC Approval 2011/5795, a Mine Closure Plan for the MPO will be submitted to the DEE at least 6 months prior to the closure of the MPO. This timeframe is outside the scope of this MOP/RMP term.

4.2 POST-MINING LAND USE GOAL

4.2.1 Final Land Use

The final land use goals for the MPO are based on the following:

- successful design and rehabilitation of landforms to ensure structural stability, revegetation success and containment of wastes; and
- post-mining land use compatible with surrounding land uses.

MACH Energy has undertaken a preliminary assessment of potential post-mining land uses (e.g. nature conservation, agriculture) taking into account relevant strategic land use objectives of the area in the vicinity of the MPO and the potential benefits of the post-mining land use to the environment, future landholders and the community. This has included consultation with MSC who has indicated a preference for the inclusion of some intensive agricultural/industrial post-mining land uses that provide employment for the local community.

Accordingly, proposed final land uses for the MPO area include permanent water infrastructure and storage areas, agricultural land, native woodland and grassland areas and the final void (Plan 4A and Figure 4-1). The Secondary Domains described in Section 5.1 reflect these final land uses.

4.2.2 Final Landform

MACH Energy is aware of the level of local interest with respect to the shape and form of MPO final mine landforms. MACH Energy has therefore developed the following design principles for the MPO final landform:

- The emplacement landform will be designed to look less “engineered” when viewed from Muswellbrook (i.e. incorporation of macro-relief to avoid simple blocky forms).
- Surface water drainage from the waste emplacement landform will incorporate micro-relief to increase drainage stability and avoid major engineered drop structures where practical.
- The final void (and associated drainage network) will be shaped to reflect a less engineered profile that is more consistent with the surrounding natural environment.

The following subsections provide further discussion of how these principles will be applied.

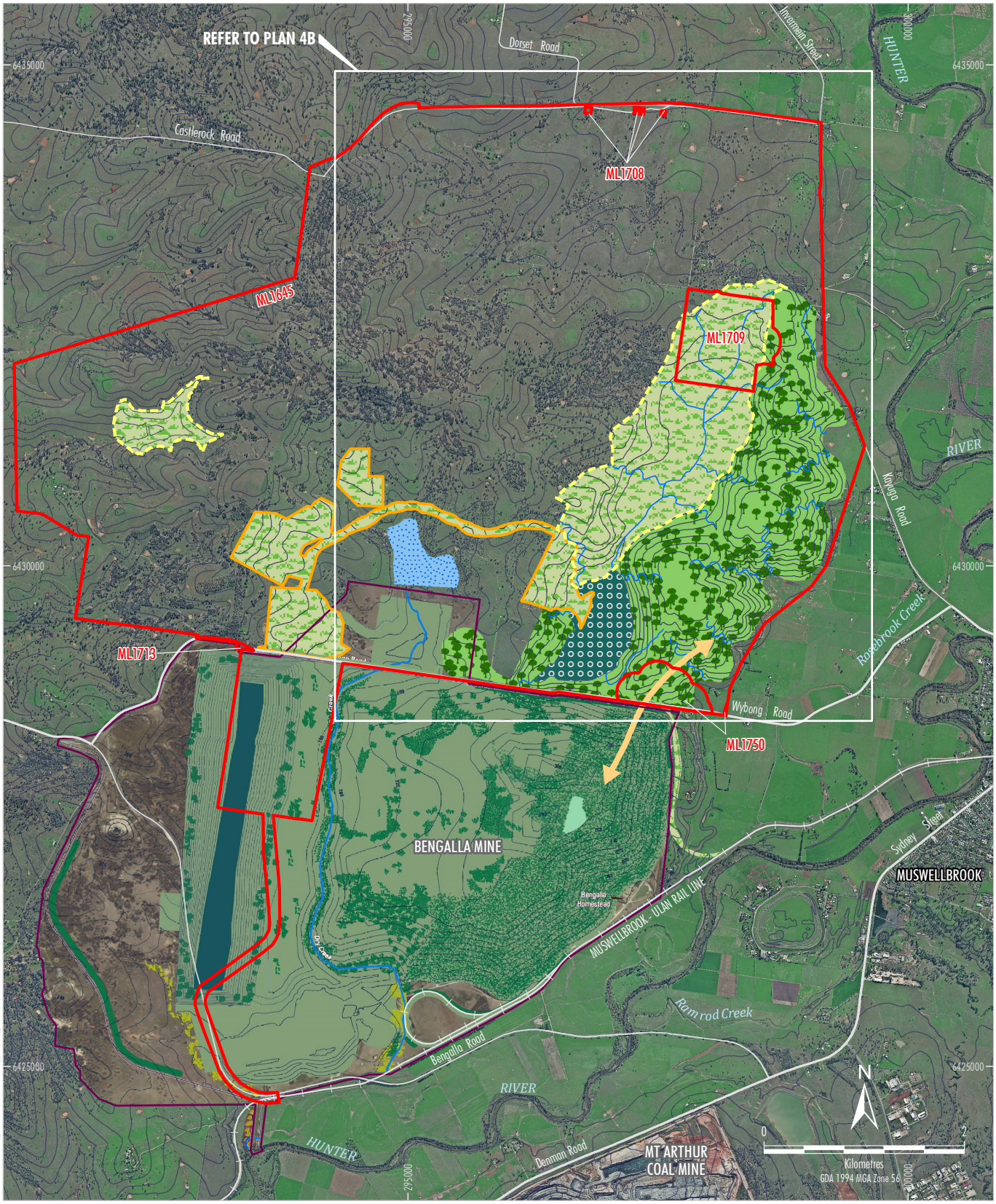
Design Integration of Macro and Micro Relief

The emplacement extension and other proposed changes to the final landform that were approved as part of MOD 3 were intended to improve the overall appearance of the MPO landform by incorporating the following concepts:

- The final landform surface of the upper lifts on the eastern side of the emplacement will be varied to break up the horizon line when viewed from the east.
- The toe of the emplacement will be extended in plan to form a more complex shape that better aligns with the underlying topography.

These elements of macro-relief on the eastern face of the final landform create a number of spurs and valleys, with the high points on the landform aligning with the spurs to further improve the more natural appearance of the landform from viewpoints to the north-east and south-east. Plan 4A provides a conceptual view of MPO final rehabilitation. The inset area on Plan 4A is reproduced on Plan 4B which provides a plan view of the final landform and includes contour and elevation detail and shows the spurs and valleys of the modified landform.

The objective of the final landform is to develop drainage features in the post-mine landform that mitigate erosion potential. This will be achieved by incorporating micro-relief into the drainage design.



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LEGEND

Mount Pleasant Mining Lease Boundary

Secondary/Post-mining Land Use Domains

- Domain A - Final Void
- Domain B - Water Infrastructure and Storage
- Domain C - Agricultural Land
- Domain D - Native Woodland/Grassland
- Potential Low Intensity Agriculture Area
- Potential High Intensity Agriculture Area
- Wildlife Corridor

Note: Light vehicle access roads and upslope diversions associated with minimising the catchment of the final void and fines emplacement area are not shown.

Bengalla Mine Conceptual Final Landform *

Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)

** Digitised from Appendix 9 of Development Consent (SSD-5170) and amended in the Mount Pleasant Operation CHPP area.*

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2019); Department of Planning and Environment (2016); MACH Energy (2018)
Orthophoto: MACH Energy (Aug 2016)

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MOUNT PLEASANT OPERATION

Indicative Final Rehabilitation and Post-mining Land Use Domains

Figure 4-1

The NSW Mineral Council's (2007) *Rehabilitation by Design Practice Notes* and Department of Environment & Climate Change's (DECC's) (2008) *Managing Urban Stormwater Soils and Construction Volume 2E Mines and Quarries* provide principles for the construction of stable batter slopes. These principles include:

- Use of a combination of convex and concave outer batters to convey runoff (i.e. as opposed to fixed slope batters).
- Appropriately spaced benches to reduce the velocity of runoff.
- Gentler slope gradients.

MACH Energy has considered these principles in developing the conceptual final landform shown on Plans 4A and 4B. These plans show the flattened slopes have been incorporated into the landform.

In particular, MACH Energy will implement the following measures to increase the stability of the final landform:

- Establish bench drains where necessary to convey runoff from batter slopes to sub-catchment drainage lines and investigate opportunities to develop small ephemeral wetlands.
- Maximise the number of sub-catchments to reduce the catchment area of individual constructed drainage lines.
- Establish meandering drainage lines that increase the total drainage length and therefore result in gentler stream bed gradients.
- Where practical, design drainage lines to generally produce a convex and concave stream bed profile.
- Establish diverse and variable density native tree cover on the outer face of the Eastern Out of Pit Emplacement and in final landform drainage features to promote stability of the final landform.

The final landform drainage lines will be designed to accommodate natural erosive processes. This will be achieved through consideration of key erosional and geomorphic characteristics such as nature of bed material (e.g. particle size), presence of rock outcrops, bed features (such as cascades, pool and riffle zones) as well as bed and bank vegetation.

Geomorphic features will be incorporated into the design of the relevant final landform drainages. This will also be informed by investigation into the physical characteristics of waste rock and soil materials at the MPO for provision of appropriate rock, sub-soil and topsoil material for use on outer batters and in drainage features.

Further refinement of the conceptual final landform has been undertaken and has involved GeoFluv™ modelling and other similar catchment/drainage review and landform design software to incorporate micro-relief and drainage/erosion control to limit the need for bench drains on the outer batters of the Eastern Out of Pit Emplacement.

Throughout the life of the MPO, the conceptual final landform may be revised to reflect the outcomes of the ongoing investigations, in consultation with MSC and relevant NSW Government agencies.

General Design Concepts – Outer Batters of Eastern Out of Pit Emplacement

The design improvement work conducted by MACH Energy to date for the outer batters of the Eastern Out of Pit Emplacement has maintained an average outer emplacement slope of approximately 10 degrees, to be generally consistent with the approved final landform of the MPO.

In order to develop a more natural looking landform, MACH Energy has incorporated significant areas of the outer emplacement batters at slopes of less than 10 degrees (lower slopes), and more limited areas of slopes up to approximately 14 degrees (upper slopes), to provide visually important slope variation, while also maintaining waste rock emplacement capacity.

In practice, significantly steeper slopes than 14 degrees in post-mining landforms can be sufficiently stable in the long term (as in the natural Hunter Valley environment), provided that they are utilised in positions in the final landform that have minimal upslope catchment (e.g. upper slopes) and are part of an integrated geomorphologically robust landform design that reflects the composition of the waste rock material.

MACH Energy will continue to refine the design of the proposed final landform, and where relevant, will justify areas to be constructed at steep grades (including slopes greater than 14 degrees) on the basis of maintaining waste emplacement capacity and how this is acceptable due to its hydrological/drainage position and/or geomorphically robust design in the final landform.

External Drainage

It is noted that the final landform is representative of the final landform that will remain if the MPO does not obtain suitable future authorisations to continue mining beyond 2026. In the event that mining did not proceed past 2026, the final landform will involve a range of earthworks to push down areas of the final highwalls and low-walls; the outcome being a single void remaining in the south with a relatively natural looking shape (Plans 4A and 4B).

In the final landform (Plans 4A and 4B) MACH Energy has sought to minimise the catchment area that reports to the eastern face of the Eastern Out of Pit Emplacement, to minimise the volume of water reporting to drainage features on the outer batters, and therefore minimise the need for highly visible traditional engineered linear drop structures.

The southern and eastern batters of the rehabilitated emplacement final landforms will drain externally to local tributary streams and ultimately to the Hunter River.

Internal Drainage

To minimise the area of steep slopes and the land sterilised by the final void, MACH Energy has designed the final landform to provide for gently sloping areas to the west of the Eastern Out of Pit Emplacement. These areas can potentially be utilised for productive agricultural industries (Section 4.2).

This includes a central area where incident rainfall will report to the final void, in part because there is a natural ridgeline to the immediate west of the open cut that remains as a topographic constraint to potential off-site site drainage of the central area if mining were to cease in 2026. It is noted that this ridgeline would be mined through in the originally approved 21 year mine life.

The design of the final void will be refined as required to ensure that the final void will not spill to the environment and will provide a groundwater sink (MACH Energy, 2017b). Final void modelling will be re-evaluated when revised groundwater inflow estimates are available from the MPO contemporary groundwater model (in preparation by HydroSimulations).

Out of Pit Emplacement – Outer Batters Construction Methodology

To facilitate the more rapid establishment of the final landform profiles, MACH Energy will generally construct the outer batters of the eastern face of the overburden emplacement in 10 metre (m) lifts that also facilitate the construction of more variable compound final landform slopes.

To maximise the topographic shielding of the evening and night-time mining operations, daytime only construction and final shaping of the outer parts of the Eastern Out of Pit Emplacement will be prioritised. This approach has the advantage of providing a visual and noise attenuation barrier between the open cut operations and the town of Muswellbrook, as well as facilitating the rapid establishment of initial rehabilitation on the lower portions of the emplacement.

4.3 REHABILITATION OBJECTIVES

The overarching rehabilitation objectives for the MPO are formalised in Table 11, Condition 53, Schedule 3 of the Development Consent DA 92/97 (refer Table 1-1 of Section 1.1 of this MOP/RMP). These rehabilitation objectives have been incorporated into the rehabilitation objectives for each MPO domain which are detailed in Section 5.2. Section 6 of this MOP/RMP also aligns the MPO domain rehabilitation objectives with performance indicators and completion criteria to enable the performance of MPO rehabilitation to be evaluated, and for remedial action to be triggered (Section 9.2).

5 REHABILITATION PLANNING AND MANAGEMENT

5.1 DOMAIN SELECTION

The provisional primary and secondary domains for the MPO are outlined in Table 5-1.

Table 5-1
Provisional MPO Domains

Code	Primary Domains	Code	Secondary Domain
1	Infrastructure Area	A	Final Void
2	Fines Emplacement Area	B	Water Infrastructure and Storage
3	Water Management Area	C	Rehabilitated Area – Agricultural Land
4	Active Void	D	Rehabilitated Area – Native Woodland/Grassland
5	Overburden Emplacement Area		

Plan 2 shows the MPO primary operational domains at the start of the MOP/RMP term. Plans 3A to 3E show the progression of development of the primary operational domains over the MOP/RMP term. Plan 4A provides a conceptual view of MPO final rehabilitation and the secondary post-mining land use domains.

5.2 DOMAIN REHABILITATION OBJECTIVES

The rehabilitation objectives for the provisional domains identified in Section 5.1 are described in Table 5-2.

Table 5-2
Domain Rehabilitation Objectives

Code	Domain	Objectives
All Domains		
N/A	All primary domain areas	Final landforms are safe, stable and non-polluting. Final landforms are stable and sustainable for the intended post-mining land use/s. Final landforms are integrated with surrounding natural landforms. Ensure public safety.
Primary Domains		
1	Infrastructure Area	Surface infrastructure not required for future use post-mining is decommissioned and removed (as agreed with relevant regulatory authorities).Area to be rehabilitated in accordance with relevant Secondary Domain rehabilitation objectives.
2	Fines Emplacement Area	Decommission and remove Fines Emplacement Area infrastructure (e.g. pumps, pipelines). Area to be rehabilitated in accordance with relevant Secondary Domain rehabilitation objectives.

Table 5-2 (continued)
Domain Rehabilitation Objectives

Code	Domain	Objectives
Primary Domains (continued)		
3	Water Management Areas	Clean water will be diverted around operational areas, where practical. Mine water dams and sediment dams are to be decontaminated and decommissioned and removed from the final landform (except for permanent water management structures and storages agreed to be retained in the final landform). Sediment dams and associated water management structures will remain in place until the catchment is rehabilitated and discharge water quality is suitable for receiving waters and fit for aquatic ecology and riparian vegetation. Area to be rehabilitated in accordance with relevant Secondary Domain rehabilitation objectives.
4	Active Void	Backfilled open cut pit voids are safe, profiled for long-term stability and non-polluting.
5	Overburden Emplacement Area	Overburden Emplacement Areas are safe, stable, and non-polluting. Constructed slopes (low walls, ramps and drainage structures) to be limited to 10 degrees or lower as standard. Exceptions may include areas of local steepening required for drainage. Mining plant and equipment associated with the construction of the Overburden Emplacement will be dismantled, decommissioned and removed from site. Incorporate micro-relief and drainage lines that are consistent with surrounding topography, to the greatest extent practicable. Maximise surface water drainage to the natural environment (excluding final void catchment).
Secondary Domains		
A	Final Void	Final void is safe, stable and non-polluting. Final void design to ensure the final void does not spill. Final void land use to be developed in consultation with relevant stakeholders. Final void shaped to be consistent with the surrounding natural environment and to avoid an engineered profile. Establish exotic pasture species on the final void, endwalls and highwalls. Final void designed as long-term groundwater sink to maximise groundwater flows across back filled pits to the final void. Minimise to the greatest extent practicable: – the size and depth of final voids; – the drainage catchment of final voids; – any high wall instability risk; and – the risk of flood interaction.

Table 5-2 (continued)
Domain Rehabilitation Objectives

Code	Domain	Objectives
Secondary Domains (continued)		
B	Water Infrastructure and Storage	Clean water diversion banks on overburden emplacements will be retained to divert water away from fill areas. Permanent water management structures will be designed and constructed prior to disturbance, in accordance with best practice guidelines, including Landcom (2004) *Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition* and DECC (2008) *Managing Urban Stormwater: Soils and Construction Volume 2*. Water retained on the site is fit for the intended post-mining land use/s, including potential long-term source of water for nearby intensive land uses (subject to obtaining relevant regulatory approvals). Water discharged from the site is suitable for receiving waters and fit for aquatic ecology and riparian vegetation.
C	Rehabilitated Area – Agricultural Land	Landform is functional and indicative of a landscape on a self-sustaining trajectory. Infrastructure would be decommissioned and removed (unless DRG agrees otherwise). Establish/restore grassland areas to support sustainable agricultural activities. Achieve the nominated land capability classification.
D	Rehabilitated Area –Native Woodland/ Grassland	Establish native vegetation comparable to suitable reference/analogue sites. Landform is functional and indicative of a landscape on a self-sustaining trajectory. Habitat features are salvaged and re-used in rehabilitation areas to provide fauna habitat resources. Restore self-sustaining native woodland ecosystems characteristic of vegetation communities found in the local area. Establish areas of self-sustaining: • riparian habitat, within any diverted and/or re-established creek lines and retained water features; • potential habitat for threatened flora and fauna species; and • wildlife corridors, as far as is reasonable and feasible, and as shown conceptually on Plan 4A.

5.3 REHABILITATION PHASES

Rehabilitation works at the MPO commenced during the previous MOP/RMP term, on the Eastern Out of Pit Overburden Emplacement.

Consistent with the MOP Guidelines, the status of the rehabilitation phases for the MPO's domains at the end of the MOP/RMP term are summarised below and progress is shown diagrammatically in Table 5-3:

- Phase 1 – Decommissioning – removal of hard stand areas, buildings, contaminated materials, hazardous materials.
- Phase 2 – Landform Establishment – incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology.

- Phase 3 – Growing Media Development – incorporates physical, chemical and biological components of the growing media and ameliorants that are used to optimise the potential of the media in terms of the preferred vegetative cover.
- Phase 4 – Ecosystem and Land Use Establishment - incorporates revegetated lands and habitat augmentation; species selection, species presence and growth together with weed and pest animal control/management; and establishment of flora.
  - To more accurately reflect the phases of rehabilitation at the MPO, the Ecosystem and Land Use Establishment phase has been further refined to include an 'Initial Rehabilitation' phase and an 'Establishment Rehabilitation Phase'.
  - The 'Initial Rehabilitation' phase reflects lands revegetated with an initial stabilising sterile cover crop to provide initial stabilisation of the reshaped area, minimise exposed surfaces and minimise the potential for dust generation.
  - The 'Established Rehabilitation' phase reflects lands that have been revegetated with species relevant to the post-mining land use of the area (e.g. native woodland/grassland species or select pasture species).
- Phase 5 – Ecosystem and Land Use Sustainability – Incorporates components of floristic structure, nutrient cycling recruitment and recovery, community structure and function, which are the key elements of a sustainable landscape.
- Phase 6 – Relinquished Lands – land use and landscape is deemed as suitable to be relinquished from the Mining Lease.

Table 5-3
Status of Rehabilitation Phases for MPO Domains at end of MOP/RMP Term

Rehabilitation Phases	1C – Infrastructure Area to be Rehabilitated to Agricultural Land	1D – Infrastructure Area to be Rehabilitated to Native Woodland/Grassland	2C – Fines Emplacement Area to be Rehabilitated to Agricultural Land	3B – Water Infrastructure and Storage to be Retained Post-Mining	3D – Water Management Areas to be Rehabilitated to Native Woodland/Grassland	4 – Active Void	5C – Overburden Emplacement to be Rehabilitated to Agricultural Land	5D – Overburden Emplacement to be Rehabilitated to Native Woodland/Grassland
Active	✓	✓	✓	✓	✓	✓	✓	✓
Decommissioning	×	×	×	×	×	×	×	×
Landform Establishment	×	×	×	×	×	×	×	✓[1]
Growing Media Development	×	×	×	×	×	×	×	✓
Ecosystem and Land Use Establishment	×	×	×	×	×	×	×	✓
Ecosystem and Land Use Sustainability	×	×	×	×	×	×	×	×
Rehabilitation Complete	×	×	×	×	×	×	×	×

[1] At the end of the MOP/RMP term, areas of the Eastern Out of Pit Overburden Emplacement will include areas at the Landform Establishment and Ecosystem and Land Use Establishment phases.

A detailed description of the rehabilitation activities proposed to be undertaken during the MOP/RMP term is provided in Section 7.2. Rehabilitation performance at the MPO will be reported in the Annual Review (Section 10).

6 REHABILITATION OBJECTIVES, PERFORMANCE INDICATORS AND COMPLETION CRITERIA

Condition 56 (h), Schedule 3 of Development Consent DA 92/97 requires performance indicators and completion criteria to be developed for evaluating the performance of the rehabilitation of the site, and for triggering remedial action (if required).

Accordingly, rehabilitation performance indicators and completion criteria have been developed and are detailed in Tables 6-1 to 6-5. The performance indicators and completion criteria reflect the MPO's overarching rehabilitation objectives provided in Condition 53, Schedule 3 of the Development Consent (Section 1.1) and the MPO domain rehabilitation objectives (Section 5.2).

The MOP Guidelines require that detailed rehabilitation performance indicators and completion criteria be prepared for each rehabilitation domain according to the following key rehabilitation phases:

- Decommissioning phase;
- Landform Establishment phase;
- Growth Media Development phase;
- Ecosystem and Land Use Establishment phase; and
- Ecosystem and Land Use Sustainability phase.

Therefore, consistent with the requirements of the MOP Guidelines, Tables 6-1 to 6-5 include performance indicators and completion criteria for each MPO domain for each of the rehabilitation phases listed above.

For the domains where the final rehabilitation and post-mining land use objectives include alternative options that are still subject to consultation and agreement (e.g. decommissioning water management infrastructure or retaining for future use post-mining), the performance indicator will be to undertake the relevant consultation to determine the final rehabilitation and post-mining land use objective. The relevant completion criteria will then be updated in future MOP/RMPs once the post-mining land use is agreed for these domains.

The following rehabilitation performance indicators and completion criteria are considered generally consistent with the six principles of the *National standards for the practice of ecological restoration in Australia* developed by the Society for Ecological Restoration Australasia (SERA) (2018), in particular Principle 3 '*Recovery of ecosystem attributes is facilitated by identifying clear targets, goals and objectives*'.

The rehabilitation performance indicators and completion criteria will be reviewed and may be updated during the Annual Review and MOP/RMP revision process (Section 10) or as a result of monitoring and research (Sections 8.1 and 8.2) to align with any changes to the MPO or incorporate any recommended measures to improve the environmental performance of the development. This iterative process for rehabilitation at the MPO, whereby the results of monitoring results and research (Section 8.2) will be used to refine the MPO's rehabilitation program, is also considered consistent with Principle 5 '*Restoration science and practice are synergistic*' of the *National standards for the practice of ecological restoration in Australia* (SERA, 2018).

Table 6-1
Rehabilitation Objectives, Performance Indicators and Completion Criteria Decommissioning Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Primary Domain 1 – Infrastructure Area						
Surface infrastructure not required for future use post-mining is decommissioned and removed (as agreed with relevant regulatory authorities).	Decommission and remove infrastructure.	Relevant surface infrastructure has been demolished and removed from the site, including buildings and fixed plant, ROM and product stockpiles, bitumen carparks, waste oil/lubricant storage areas, rail load-out facility and rail loop.	Development Consent – Schedule 3, Condition 53	No	N/A	Not Commenced
		All demolition work has been carried out in accordance with AS2601-2001: *The Demolition of Structures* or its latest version.		No	N/A	Not Commenced
		Internal haul roads, access tracks and hardstands have been removed when no longer required.		No	N/A	Not Commenced
Primary Domain 2 – Fines Emplacement Area						
Decommission and remove Fines Emplacement Area infrastructure (e.g. pumps, pipelines).	Decommission and remove infrastructure.	Pipelines, pumps and related Fines Emplacement Area infrastructure removed.	Development Consent – Schedule 3, Condition 53	No	N/A	Not Commenced
Primary Domain 3 – Water Management Areas						
Mine water dams and sediment dams are to be decontaminated, decommissioned and removed from final landform (except for permanent water management structures and storages agreed to be retained in the final landform).	Hazardous materials.	Sediments accumulated in mine water and sediment dams are removed from the dam floor and emplaced in the final void.	Development Consent – Schedule 3, Condition 53	No	N/A	Not Commenced
		Mine water dams are emptied and discharge water disposed of in final void.		No	N/A	Not Commenced
	Mine water structures are decommissioned.	Water management structures that are not to be retained in the final landform have been decommissioned (i.e. dam walls removed, drained and decontaminated).		No	N/A	Not Commenced

Table 6-1 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Decommissioning Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Primary Domain 5 – Overburden Emplacement Area						
Mining plant and equipment associated with the construction of the Overburden Emplacement will be dismantled, decommissioned and removed from site.	Removal of plant and equipment.	Relevant plant and equipment has been dismantled, decommissioned and removed from the overburden emplacement area.	Development Consent – Schedule 3, Condition 53	No	N/A	Not Commenced

Table 6-2
Rehabilitation Objectives, Performance Indicators and Completion Criteria Landform Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
All Primary Domains						
Final landforms are safe, stable and non-polluting. Final landforms are stable and sustainable for the intended post-mining land use/s.	Slopes.	Constructed slopes (low walls, ramps and drainage structures) to be limited to 10 degrees or lower as standard. Exceptions, where angles of 10 degrees will include: • the highwall, lowwall, safety berm and top batter of the final void; and • local steepening of areas for drainage on the Overburden Emplacement.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
	Landform stability.	Revegetation and/or cover crop undertaken within six months of landform reconstruction and soil application. Reconstructed landforms are stable with no evidence of slumping.		No	Section 9.2	Not Commenced
	Non-polluting landform.	Runoff from rehabilitated landforms is equivalent to runoff from pre-mining and/or analogous catchments (when considering the natural range of values).		No	N/A	Not Commenced
Ensure public safety.	Public safety.	Public access restricted to mine site and rehabilitation areas.		Yes	N/A	Complete
Final landforms are integrated with surrounding natural landforms.	Landform compatibility.	Avoidance of straight lines and angular corners in profiles of final landforms. Drainage lines to be self-sustaining and predominantly constructed of natural materials. Visual screens comprising mounding or bunding are established as per the VIMP. Water management areas, drainage paths, contour drains, ridgelines, and emplacements are shaped, where possible, in undulating informal profiles in keeping with natural landforms of the surrounding environment.	Development Consent – Schedule 3, Condition 53	No	N/A	Not Commenced

Table 6-2 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Landform Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Primary Domain 5 – Overburden Emplacement Area						
Overburden Emplacement Areas are safe, stable and non-polluting.	Non-polluting landform.	Materials with a propensity to generate acid mine drainage (e.g. reject material and Wynn seam overburden material) are buried under inert material, with a minimum cover of 10 m.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Commenced
Constructed slopes (low walls, ramps and drainage structures) to be limited to 10 degrees or lower as standard. Exceptions may include areas of local steepening required for drainage.	Landform design.	Suitably qualified and experienced Geomorphologist confirms landform design incorporates micro-relief and drainage lines consistent with the surrounding topography.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Commenced
Incorporate micro-relief and drainage lines that are consistent with surrounding topography, to the greatest extent practicable.						
Maximise surface water drainage to the natural environment (excluding final void catchment).	Free draining landform.	Modelling of landform design indicates the landform is free draining (excluding the retained final void) to allow effective catchment contribution and yield to the Hunter River.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Secondary Domain A – Final Void						
Final void is safe, stable and non-polluting.	The void surrounds are safe (for humans and stray stock).	Perimeter bund constructed, is stable and vegetated with self-regenerating and perennial cover crop.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		Void fenced and warning signs posted along the fence, in a manner satisfactory to the Resource Regulator.		No	N/A	Not Commenced
	Slopes.	Low walls have been battered back to slopes less than 18 degrees, unless otherwise agreed with Resources Regulator.		No	Section 9.2	Not Commenced

Table 6-2 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Landform Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Secondary Domain A – Final Void (Continued)						
Final void is safe, stable and non-polluting.	Non-polluting landform.	No carbonaceous materials are exposed in the final void floor/walls.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		Size and depth of final void is in accordance with the approved final void design.		No	Section 9.2	Not Commenced
Designed as long-term groundwater sinks to maximise ground water flows across back filled pits to the final void.	Groundwater modelling.	Modelling indicates that final landform and void design is a groundwater sink.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Minimise to the greatest extent practicable the size and depth of final voids.	Final void design.	Final void design has reduced the size and depth of the void by backfilling and landform reconstruction works.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Minimise to the greatest extent practicable the drainage catchment of final voids.	Landform and surface water modelling.	Surface water modelling indicates final void catchment has been reduced to the greatest extent possible.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Minimise to the greatest extent practicable any high wall instability risk.	Geotechnical stability and design.	The final void highwalls and low walls are constructed in accordance with an approved Final Void Geotechnical Design.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		The final void highwalls and low walls have been assessed by a qualified geotechnical engineer to validate long-term stability.		No	Section 9.2	Not Commenced
Minimise to the greatest extent practicable the risk of flood interaction.	Flood modelling.	Modelling indicates that final landform and void design has minimal interaction with flooding from surrounding areas.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced

Table 6-2 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Landform Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Secondary Domain B – Water Infrastructure and Storage						
Final landforms are safe, stable and non-polluting.	Final landform drainage design.	Final landform water management structures and storages have been designed and constructed in accordance with 'Blue Book' (i.e. Landcom [2004] *Managing Urban Stormwater: Soils and Construction Volume 1 4th Edition* and DECC [2008] *Managing Urban Stormwater: Soils and Construction Volume 2*) requirements and the approved final landform drainage design.	Development Consent – Schedule 3, Condition 53	No	N/A	Not Commenced
		Use of permanent drop structures is avoided where practical.		No	N/A	Not Commenced

Table 6-3
Rehabilitation Objectives, Performance Indicators and Completion Criteria Growing Media Development Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
All Domains						
Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources, to the greatest extent practicable.	Topsoil/subsoil salvaging.	Topsoil and subsoils are stripped and re-spread or stockpiled for later use in accordance with soil stripping and stockpiling procedures provided in the MPO's Topsoil Stripping Management Plan.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Commenced
	Material salvaging.	Trees, logs, rocks salvaged during clearing activities and stockpiled for use in rehabilitation.		No	Section 9.2	Commenced
	Seed collection.	Seed collected during clearing when available and managed in Seed Harvesting Facility.		No	Section 9.2	Commenced

Table 6-4
Rehabilitation Objectives, Performance Indicators and Completion Criteria Ecosystem and Land Use Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
All Domains						
Suitability of vegetation is fit for the intended post mining land use.	Vegetation characteristics.	Monitoring indicates vegetation (native woodland or pasture) is on a trajectory towards comparable analogue sites.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Secondary Domain C – Rehabilitation Area – Low Intensity Agriculture						
Establish/restore grassland areas to support sustainable agricultural activities.	Pasture establishment.	Monitoring and trials indicate perennial pasture establishment is on a trajectory towards analogue grazing sites as determined by a suitably qualified Agronomist.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Achieve the nominated land capability classification.	Land Capability Class.	Monitoring indicates that areas developing Land Suitability Class 4, 5 or 6 as determined by a suitably qualified Agronomist.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Secondary Domain D – Rehabilitation Area – Native Woodland/Grassland						
Restore self-sustaining native woodland ecosystems characteristic of vegetation communities found in the local area.	Species composition.	Monitoring results indicate overstorey species characteristic of surrounding native vegetation are present.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		Monitoring results indicate native ground cover species are on a self-sustaining trajectory towards equivalent data from analogue sites.		No	Section 9.2	Not Commenced
	Vegetation structure.	Monitoring results indicate that vegetation community structure (the density of trees, shrubs, grasses and forbs) is on a self-sustaining trajectory towards equivalent data from analogue sites.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		Monitoring results indicate that overstorey and cover density are on a self-sustaining trajectory towards equivalent data from analogue sites.		No	Section 9.2	Not Commenced

Table 6-4 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Ecosystem and Land Use Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Secondary Domain D – Rehabilitation Area – Native Woodland/Grassland						
Establish areas of self-sustaining riparian habitat, within any diverted and/or re-established creek lines and retained water features.	Species composition and vegetation structure.	Monitoring results indicate that vegetation community structure (the density of trees, shrubs, grasses and forbs), and species composition represents riparian habitat and is on a self-sustaining trajectory towards equivalent data from analogue sites.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Establish areas of self-sustaining potential habitat for threatened flora and fauna species.	Species composition and vegetation structure.	Monitoring results indicate that vegetation community structure (the density of trees, shrubs, grasses and forbs) and species composition is representative of habitat to support some threatened flora and fauna, and is on a self-sustaining trajectory towards equivalent data from analogue sites.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Establish areas of self-sustaining wildlife corridors, as far as is reasonable and feasible.	Vegetation cover and continuity.	Monitoring results and aerial imagery shows continuity of native woodland vegetation across the eastern slope which borders (up to Wybong Road) the proposed woodland rehabilitation at the Bengalla Mine to the south.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced

Table 6-5
Rehabilitation Objectives, Performance Indicators and Completion Criteria Ecosystem and Land Use Sustainability Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Secondary Domain B – Water Infrastructure and Storage						
Water retained on the site is fit for the intended post-mining land use/s.	Water quality.	Water monitoring indicates onsite water is suitable for the post-mining land use (i.e. agriculture, native ecosystem).	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Water discharged from the site is suitable for receiving waters and fit for aquatic ecology and riparian vegetation.	Water quality.	Water monitoring indicates onsite water is comparable to surrounding analogue sites and suitable for receiving waters, aquatic ecology and riparian vegetation.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Secondary Domain C – Rehabilitation Area – Agriculture land						
Establish/restore grassland areas to support sustainable agricultural activities.	Pasture establishment.	Monitoring and trials indicate suitable perennial pasture establishment for grazing purposes has been achieved compared to analogue sites as determined by a suitably qualified Agronomist.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
Achieve the nominated land capability classification.	Land Capability Class.	Monitoring indicates that areas have developed Land Suitability Class 4, 5 or 6 as determined by a suitably qualified Agronomist.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced

Table 6-5 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Ecosystem and Land Use Sustainability Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Secondary Domain D – Rehabilitation Area –Native Woodland/Grassland						
Self-sustaining native woodland ecosystems established characteristic of vegetation communities found in the local area.	Long-term species composition.	Monitoring results indicate overstorey species characteristic of surrounding native vegetation are present.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		Monitoring results indicate native ground cover species are on a self-sustaining trajectory towards equivalent data from analogue sites (e.g. evidence of seed set).		No	Section 9.2	Not Commenced
	Long-term vegetation structure.[1]	Monitoring results indicate that vegetation community structure (the density of trees, shrubs, grasses and forbs) is on a self-sustaining trajectory towards equivalent data from analogue sites.		No	Section 9.2	Not Commenced
	Long-term vegetation Functionality.	Monitoring results indicate that vegetation is on a self-sustaining trajectory including many species setting seed.		No	Section 9.2	Not Commenced
	Interim native plant species richness.[2]	For PCT 483, the rehabilitation will achieve >6 species for the native plant species richness.		No	Section 9.2	Not Commenced
		For PCT 1605, the rehabilitation will achieve >9 species for the native plant species richness.		No	Section 9.2	Not Commenced
		For PCT 1604, the rehabilitation will achieve >11 species for the native plant species richness.		No	Section 9.2	Not Commenced

Table 6-5 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Ecosystem and Land Use Sustainability Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Secondary Domain D – Rehabilitation Area –Native Woodland/Grassland (continued)						
Self-sustaining native woodland ecosystems established characteristic of vegetation communities found in the local area (continued)	Interim Over-storey cover.[2]	For PCT 483, the rehabilitation will achieve >1% of the native over-storey cover.	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		For PCT 1605, the rehabilitation will achieve >3% of the native over-storey cover.		No	Section 9.2	Not Commenced
		For PCT 1604, the rehabilitation will achieve >2% of the native over-storey cover.		No	Section 9.2	Not Commenced
	Interim Mid-storey cover.[2]	For PCT 483, the rehabilitation will achieve >1% of the native mid-storey cover.		No	Section 9.2	Not Commenced
		For PCT 1605, the rehabilitation will achieve >2% of the native mid-storey cover.		No	Section 9.2	Not Commenced
		For PCT 1604, the rehabilitation will achieve >1% of the native mid-storey cover.		No	Section 9.2	Not Commenced
	Interim Native groundcover (grasses).[2]	For PCT 483, the rehabilitation will achieve >1% of the native ground cover (grasses).		No	Section 9.2	Not Commenced
		For PCT 1605, the rehabilitation will achieve >1% of the native ground cover (grasses).		No	Section 9.2	Not Commenced
		For PCT 1604, the rehabilitation will achieve >3% of the native groundcover (grasses).		No	Section 9.2	Not Commenced
	Interim Native groundcover (shrubs).[2]	For PCT 483, the rehabilitation will achieve >1% of the native groundcover (shrubs).		No	Section 9.2	Not Commenced
		For PCT 1605, the rehabilitation will achieve >1% of the native groundcover (shrubs).		No	Section 9.2	Not Commenced
		For PCT 1604, the rehabilitation will achieve >1% of the native groundcover (shrubs).		No	Section 9.2	Not Commenced

Table 6-5 (Continued)
Rehabilitation Objectives, Performance Indicators and Completion Criteria Ecosystem and Land Use Sustainability Phase

Domain Objective	Performance Indicator	Completion Criteria	Justification Source	Complete	Link to TARP	Progress
Secondary Domain D – Rehabilitation Area –Native Woodland/Grassland (continued)						
Self-sustaining native woodland ecosystems established characteristic of vegetation communities found in the local area (continued)	Interim Native groundcover (other).[2]	For PCT 483, the rehabilitation will achieve >1% of the native groundcover (other).	Development Consent – Schedule 3, Condition 53	No	Section 9.2	Not Commenced
		For PCT 1605, the rehabilitation will achieve >1% of the native groundcover (other).		No	Section 9.2	Not Commenced
		For PCT 1604, the rehabilitation will achieve >2% of the native Groundcover (other).		No	Section 9.2	Not Commenced
	Interim Exotic plant cover.[2]	For PCT 483, PCT 1605, and PCT 1604, exotic plant cover will be <60%.		No	Section 9.2	Not Commenced
	Interim Total length of fallen logs.[2]	For PCT 483, the rehabilitation will achieve >12.5 m of total length of fallen logs.		No	Section 9.2	Not Commenced
		For PCT 1605, the rehabilitation will achieve >18.25 m of total length of fallen logs.		No	Section 9.2	Not Commenced
		For PCT 1604, the rehabilitation will achieve >1.25 m of total length of fallen logs.		No	Section 9.2	Not Commenced

[1] In the absence of quantitative data from relevant analogue monitoring sites located within local PCT areas, appropriate stem densities would be guided by Gibbons et. al. (2010) *Benchmark stem densities for forests and woodlands in south-eastern Australia under conditions of relatively little modification by humans since European settlement*.

[2] In the absence of quantitative data from relevant analogue monitoring sites located within local PCT areas, interim completion criteria for each PCT have been included which have been developed using the methodology provided in Table 6 of the OEH (2014) *Framework for Biodiversity Assessment* and the relevant OEH vegetation condition benchmarks for each PCT (OEH, 2017). The 'Allowable increase in the site attribute condition score from zero' assigned in Table 6 of the *Framework for Biodiversity Assessment* (OEH, 2014) has been conservatively chosen as a minimum of 0.5. Table 6 of the OEH (2014) *Framework for Biodiversity Assessment* is provided as Attachment 3 of this MOP/RMP. Once a data set has been obtained from relevant analogue monitoring sites over a number of monitoring rounds, the completion criteria set will be revised to reflect the data from the analogue sites.

Notes:
PCT 483 – Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley.
PCT 1605 – Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter.
PCT 1604 – Narrow-leaved Ironbark – Grey Box – Spotted Gum shrub – grass woodland of the central and lower Hunter.

6.1 MINE CLOSURE AND LEASE RELINQUISHMENT

Upon the cessation of mining operations, tenure of MLs will be maintained by MACH Energy until such a time when lease relinquishment criteria have been met and rehabilitation is to the satisfaction of relevant regulatory authorities including the Resources Regulator and the DPE. It is anticipated that lease relinquishment criteria would include:

- Rehabilitated landforms are stable and consistent with the nominated post-mining land use which has been developed in consultation with relevant regulatory agencies and key stakeholders.
- All rehabilitation and mine closure completion criteria have been met.
- All Mining Lease conditions (including public safety considerations) have been satisfied.
- Hard-stand areas and infrastructure have been removed (unless otherwise agreed with the ultimate landholder).

In accordance with Condition 21 of EPBC Approval 2011/5795, a Mine Closure Plan for the MPO will be submitted to the DEE at least 6 months prior to the closure of the MPO. The Mine Closure Plan would be prepared in consideration of the International Council on Mining and Metals (ICMM) (2018) *Integrated Mine Closure Good Practice Guide*. Mine closure concepts and management measures will continue to be developed via the MOP/RMP and MPO Rehabilitation Strategy revision process in consultation with the DPE, Resources Regulator and other relevant regulatory agencies.

A socio-economic study will be commissioned five years prior to expected mine closure, which will evaluate and address the following:

- developing a contemporary baseline of the MPO workforce and community profile;
- identifying potential socio-effects (positive and negative) of the mine closure on the MPO workforce, associated workforce (subcontractors, suppliers) and the broader community;
- proposing measures to minimise potential negative effects and maximise potential positive effects of mine closure, in consultation with stakeholders; and
- developing a draft implementation programme for the measures identified to address social effects.

The findings of the socio-economic study may inform the subsequent versions of the MPO Rehabilitation Strategy and the MOP/RMP. For example, consultation undertaken to date with MSC has identified a preference for intensive agricultural/industrial post-mining land uses that provide employment for the local community. This has been taken into consideration in the final landform design and rehabilitation domains with proposed areas nominated for such land uses. If this preference changes over time, the MPO Rehabilitation Strategy and this MOP/RMP will be updated, considering the progress of final landform established and economic factors.

7 REHABILITATION IMPLEMENTATION

Sections 7.2 and 7.3 describe the proposed rehabilitation activities during the MOP/RMP term. Activities will focus on rehabilitation of completed areas of the Eastern Out of Pit Overburden Emplacement including native woodland/grassland vegetation, and ongoing temporary stabilisation works. Section 7.2.3 specifically describes the process to reinstate native woodland and fauna habitat, as well as agricultural grassland areas in accordance with Condition 56(e), Schedule 3 of the Development Consent.

7.1 STATUS AT MOP/RMP COMMENCEMENT

Rehabilitation at the MPO commenced during the previous MOP/RMP term. Rehabilitation works commenced on the south-eastern extent of the Eastern Out of Pit Overburden Emplacement.

At the start of this MOP/RMP term, approximately 9 ha of the Eastern Out of Pit Overburden Emplacement has been prepared for rehabilitation including approximately 6.5 ha at the Landform Establishment phase and approximately 2.6 ha at the Ecosystem and Landform Establishment phase with Initial Rehabilitation established (i.e. the area has been shaped, contoured and topsoil applied and revegetated with select sterile cover crop species).

7.2 PROPOSED REHABILITATION ACTIVITIES DURING THE MOP/RMP TERM

During the MOP/RMP term, rehabilitation of areas of the Eastern Out of Pit Overburden Emplacement will continue to be the focus of rehabilitation works (once the areas become available) (Plans 3A to 3E).

Sections 7.2.1 to 7.2.4 provide a description of the process for reinstatement of native woodland and agricultural grassland areas (Sections 7.2.3 and 7.2.4 respectively), in accordance with the requirements of Condition 54(e), Schedule 3 of the Development Consent.

The monitoring of rehabilitation performance is described in Section 8.1 and rehabilitation research trials are described in Section 8.2. MACH Energy proposes to build on industry rehabilitation research results by using the results of monitoring and trials to refine the rehabilitation program at the MPO.

7.2.1 Rehabilitation Materials

Consistent with the rehabilitation objectives within Table 11, Condition 53 of Schedule 3 of the Development Consent DA 92/97, MACH Energy will undertake measures to retain as much material as practicable from the pre-mining landform and surrounds to use during rehabilitation of the MPO. Such measures will include:

- Implementing a VCP which will identify and retain material for rehabilitation including habitat material (e.g. tree hollows, stag trees, coarse woody debris and rocks) and seeding vegetation for seed collection prior to clearing.
- Seed collection and propagation using the on-site Seed Harvesting Facility or external provider.
- Rehabilitation material characterisation in order to:
  - identify any physical or chemical deficiencies or limiting factors;
  - develop selective placement strategies or develop soil amelioration techniques;
  - identify material for use in the root zone, which is capable of supporting sustainable vegetation establishment;

  - identify materials that limit plant growth or which may contaminate surface or groundwater (e.g. salinity), and hence may require special handling, treatment or disposal; and
  - identify any propensity for spontaneous combustion.
- Topsoil stripping (guided by soil mapping) and management in designated stockpiles.

A detailed description of the MPO's VCP and seed collection and propagation procedures using the on-site Seed Harvesting Facility is provided in the MPO's Biodiversity Management Plan. As a component of the MPO's internal Rehabilitation Procedure, a seed/seedling supply plan will also be developed to ensure adequate quantities of seed/seedlings are available for each rehabilitation campaign, or if seed/seedlings will be required to be externally sourced.

Section 3.2.7 of this MOP/RMP outlines the soil management procedures that will be implemented at the MPO including the procedures for characterising the suitability of stored soil for rehabilitation use.

7.2.2 Progressive Emplacement Outer Batter Re-Shaping and Rehabilitation

During the MOP/RMP term, MACH Energy will prioritise construction of the eastern outer batters of the Eastern Out of Pit Overburden Emplacement to the final landform profile. The emplacement landform would be developed in 10 m lifts to enable more rapid establishment of the final surface levels, as waste rock placement progresses more rapidly than the alternative of construction in 20 m emplacement lifts that takes significantly longer to develop, and also requires longer to reshape.

Topsoil and other rehabilitation materials would be stripped, managed and spread onto rehabilitation areas as described in Section 3.2.7. Habitat augmentation features (including for example stags, coarse woody debris and rocks) would then be placed on the prepared rehabilitation areas, and the area revegetated with an initial sterile cover crop. Tubestocking and/or seeding with target revegetation community species (Section 7.2.3) would then be undertaken when suitable climatic conditions prevail.

MACH Energy anticipates targeting reshaping to final surface level and initial revegetation of all outer emplacement batter lifts of the Eastern Out of Pit Emplacement within 6 months of each subsequent dump panel lift being completed (subject to delays associated with climatic extremes).

A Rehabilitation Procedure has been developed to guide rehabilitation activities at the MPO and to ensure rehabilitation methods/practices are replicated during each rehabilitation campaign.

7.2.3 Reinstating Native Woodland Ecosystems for Threatened Flora and Fauna

In accordance with the rehabilitation objectives in Table 11 of Condition 53, of Schedule 3 of the Development Consent, the proposed native ecosystem areas would aim to restore self-sustaining native woodland ecosystems characteristic of vegetation communities found in the local area. In addition, MACH Energy is required to include development of:

- riparian habitat, within any diverted and/or re-established creek lines and retained water features;
- potential habitat for threatened flora and fauna species; and
- wildlife corridors, as far as is reasonable and feasible.

The following subsections provide a description of how MACH Energy will meet these objectives.

Native woodland ecosystems and habitat for threatened flora and fauna

Updated vegetation mapping of the whole MPO area was undertaken following approval of MOD 3 (Hunter Eco, 2018) in order to align vegetation communities with contemporary PCT definitions and inform target woodland ecosystems and species selection for rehabilitation (Plan 1B-1).

Analysis of this vegetation mapping indicates that the most widespread communities being disturbed by the MPO are the following:

- PCT 483 - Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley (represents White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community).
- PCT 1604 - Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter.
- PCT 1605 - Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter.

These communities would be targeted for rehabilitation as ecosystems characteristic of vegetation communities found in the local area and also to provide potential habitat for threatened flora and fauna. A summary of the PCT communities targeted for revegetation and its associated upper, middle and ground stratum species is provided in Table 7-1. As part of development of the MPO's internal Rehabilitation Procedure, a revegetation rationale will be developed to guide where each PCT will be re-established on MPO final landforms (e.g. Ironbark communities would be more suited slope areas and Grey Box – White Box communities would be more suited to lower slopes and flatter areas). It is anticipated that the PCTs targeted for rehabilitation and the revegetation rationale would be further augmented and refined over the life of the MPO based on the results of on-site investigations and rehabilitation trials, and consultation with key stakeholders.

Consistent with the MPO's Rehabilitation Strategy and MSC's recommendations, highly competitive exotic grasses (e.g. Rhodes Grass [*Chloris gayana*]) and non-local Australian species (e.g. Golden Wreath Wattle [*Acacia saligna*]) will not be used anywhere on-site.

Riparian Habitat

The main drainage feature within the vicinity of the MPO is the Hunter River, which flows in a southerly direction approximately 1 km to the east of the MPO area. The pre-mining environment of the MPO consists of a number of ephemeral drainage lines that drain into the Hunter River, however no perennial streams/creeks exist on-site. The final landform design therefore has not considered re-establishing creek lines. The only retained water features in the final landform will be the final void and potentially the Mine Water Dam on the southern boundary of ML 1645.

Revegetation of the final void will use species that are appropriate for its steepness and aspect, however this is not envisaged to create a riparian ecosystem, rather this vegetation will be used for stabilisation and aesthetic purposes.

The Mine Water Dam at the southern boundary of ML 1645 will potentially be retained for high intensity agriculture, and may potentially provide conditions for establishment of riparian habitat. If the water storage is retained, vegetation species occurring in riparian areas of the surrounds will be used for revegetation. Species that would be targeted for revegetation of this area may include:

- Upper stratum - *Eucalyptus camaldulensis*, *Casuarina cunninghamiana* subsp*. cunninghamiana*, *Angophora floribunda.*
- Middle stratum - *Melicytus dentatus*, *Callistemon salignus*.

Table 7-1
Plant Community Types Proposed for Native Ecosystem Rehabilitation

PCT	PCT Name	Formation	Class	Applicable TEC	Upper stratum	Middle stratum	Ground stratum
483	Grey Box – White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Grassy Woodlands	Western Slopes Grassy Woodland	Listed BC Act, E: White Box Yellow Box Blakely's Red Gum Woodland; Listed EPBC Act, CE: White Box Yellow Box Blakely's Red Gum Woodland	• *Eucalyptus moluccana* • *Eucalyptus albens* • *Brachychiton populneus subsp. Populneus* • *Angophora floribunda* • *Eucalyptus melliodora*	• *Notelaea microcarpa* • *Maireana microphylla* • *Sclerolaena muricata* • *Pimelea curvifloa var. curviflora*	• *Austrostipa, bigeniculata* • *Bothriochloa macra* • *Boerhavia dominii* • *Oxalis perennans* • *Elymus scaber var. scaber* • *Cynodon dactylon* • *Chamaesyce drummondii* • *Hibiscus trionum* • *Einadia nutans subsp. nutans* • *Austrostipa aristiglumis* • *Aristida personata* • *Asperula conferta* • *Rumex brownii* • *Mentha diemenica* • *Cyperus gracilis* • *Geranium solanderi var. solanderi* • *Austrostipa nodosa* • *Calotis lappulacea* • *Glycine latifolia* • *Chloris truncata*

Table 7-1 (continued)
Plant Community Types Proposed for Native Ecosystem Rehabilitation

PCT	PCT Name	Formation	Class	Applicable TEC	Upper stratum	Middle stratum	Ground stratum
1605	Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter	Dry Sclerophyll Forests (Shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	Listed BC Act, E: Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions; Listed EPBC Act, CE: Central Hunter eucalypt forest and woodland	• *Eucalyptus crebra* • *Notelaea microcarpa*	• *Maireana microphylla* • *Myoporum montanum* • *Olearia elliptica* • *Pittosporum undulatum* • *Breynia oblongifolia* • *Acacia paradoxa*	• *Microlaena stipoides* • *Austrodanthonia racemosa* • *Dichelachne micrantha* • *Dichondra repens* • *Daucus glochidiatus* • *Cheilanthes sieberi*
1604	Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter	Grassy Woodlands	Coastal Valley Grassy Woodlands	Listed BC Act, E: Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions; Listed EPBC Act, CE: Central Hunter eucalypt forest and woodland; Listed EPBC Act, CE: White Box Yellow Box Blakely's Red Gum Woodland	• *Eucalyptus crebra* • *Eucalyptus moluccana* • *Corymbia maculata*	• *Bursaria spinosa* • *Olearia elliptica*	• *Eremophila debilis* • *Cymbopogon refractus* • *Aristida ramosa* • *Aristida vagans* • *Microlaena stipoides* • *Austrodanthonia fulva* • *Cheilanthes sieberi* • *Lomandra multiflora* • *Brunoniella australis*

- Lower stratum - *Austrostipa verticillata*, *Austrodanthonia* spp., *Cynodon dactylon*, *Microlaena stipoides* var. *stipoides*, *Bothriochloa macra*, *Eleocharis sphacelata*, *Lomandra longifolia*, *Carex appressa.*

During the operational phase of the MPO, riparian vegetation (including sedge and rush species) would also be established around sediment dams to provide areas of riparian habitat.

Wildlife Corridor

Consistent with MSC's recommendations for the Bengalla Mine final landform, the eastern face of the MPO final landform would be revegetated with native tree species as shown in (Plan 4A and Figure 4-1). This would allow the landform to assimilate with the open woodland communities within the surrounding environment.

The revegetated eastern face would provide a contiguous wildlife corridor with the revegetated eastern face of the Bengalla Mine for native woodland bird species (Plan 4A). Given the close proximity of the revegetated woodland areas, bird species could utilise both areas for habitat establishment and foraging. In addition, the vegetation on the eastern face of the MPO Eastern Out of Pit Overburden Emplacement would develop a contiguous wildlife corridor with the Bengalla Mine rehabilitation and surrounding remnant woodland, and also be visually consistent with the revegetation of the eastern face of the Bengalla Mine landform.

7.2.4 Reinstating Agricultural Grassland Areas

Consultation with MSC indicated a preference for intensive agricultural/industrial post-mining land uses that provide employment for the local community. Consequently, rehabilitation of the MPO will consider both low and high intensity agricultural land uses.

Low intensity agriculture would consist of reinstating grazing country and high intensity agriculture may include feedlots, poultries or agricultural produce processing facilities, however until such a time a proposal is developed for such uses, these areas would be rehabilitated to low intensity agriculture. Descriptions of currently proposed low and high intensity agriculture post mining land uses is provided below. These land uses may be refined through further consultation with MSC and other stakeholders (including the MPO's CCC) during the MPO mine life.

Low Intensity Agriculture

The areas proposed for low intensity agriculture are shown on Plan 4A and would be prepared to accommodate sustainable agricultural activities such as sustainable/managed livestock grazing. The objective will be to establish areas to be classified as Land Capability Class 4, Class 5 or Class 6 lands, which are suitable for grazing, but not cropping, forestry or other high intensity uses. The definitions of Land Capability Class 4, 5 and 6 lands (as defined by the OEH [2012] *The land and soil capability assessment scheme: second approximation - a general rural land evaluation system for New South Wales*) are provided in Table 7-2. It should be noted that although the definitions of Land Capability Class 5 and 6 lands include land uses such as forestry and nature conservation (in addition to grazing), MACH Energy does not propose to establish forestry on the rehabilitation areas proposed for low intensity or high intensity agriculture.

Table 7-2
Land Capability Classes Proposed for Low Intensity Agriculture Areas

Class	Definition
4	**Moderate capability land**: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised
5	**Moderate–low capability land**: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
6	**Low capability land**: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation

Source: OEH (2012).

Low intensity agricultural rehabilitation areas would be cultivated and then broadcast sown with pasture species. The species mix would be developed in consultation with an agronomist, and depend on the growth media available and environmental conditions at the time of rehabilitation. Species selection would also take into consideration its ability to encroach on rehabilitation areas proposed for native ecosystem re-establishment.

Improved pasture species commonly present in the surrounding grazing country that would be considered for rehabilitation of low intensity agricultural areas include:

- Subterranean clover (*Trifolium subterranean*).
- White Clover (*Trifolium repens*).
- Lucerne (*Medicago sativa*).
- Green Panic (*Panicum coloratum*).
- Kikuyu Grass (*Pennisetum clandestinum*).
- Perennial Rye (*Lolium perenne*).
- Phalaris (*Phalaris aquatica*).
- Oat (*Avena sativa*).

Native grass species will also be considered in pasture species such as *Cynodon dactylon* (Couch), *Austrodanthonia* spp. (Wallaby grasses) and *Austrostipa* spp. (Spear grasses) which have been shown to develop well in post mining landscapes of the Hunter Valley (Huxtable, Koen and Waterhouse, 2005).

Consistent with the MPO's Rehabilitation Strategy and MSC's recommendations, highly competitive exotic grasses (e.g. Rhodes Grass [*Chloris gayana*]) and non-local Australian species (e.g. Golden Wreath Wattle [*Acacia saligna*]) will not be used anywhere on-site.

High Intensity Agriculture

High intensity agriculture areas have been proposed as a result of consultation with MSC who has indicated its preference for post mining land uses that may provide local employment. Activities that may be classed as high intensity include feedlots, poultries and glasshouse. Until such a time a proposal is developed for such uses, these areas would be rehabilitated to low intensity agriculture. Areas currently proposed for high intensity agriculture have been identified on Plan 4A, and have been nominally located at this stage due to their topography and proximity to a potential water storage dam for water supply.

High intensity agriculture areas will be refined in consultation with MSC and relevant stakeholders (including the MPO's CCC) throughout the life of the MPO, and will depend on such factors as commercial interest. Any development of high intensity agriculture will be subject to development approval with the relevant consent authority.

7.2.5 Rehabilitation of Existing Rail Loop and Infrastructure Corridor

Under Condition 37, Schedule 3 of Development Consent DA 92/97, MACH Energy is required to remove all infrastructure associated with the development within ML 1645 south of Wybong Road (other than infrastructure which can remain in situ, with the agreement of Bengalla Mine) and transfer ownership to Bengalla Mine. MACH Energy is required to perform interim rehabilitation on this area, prior to transfer of ownership, as required by Condition 55A, of Schedule 3 of the Development Consent DA 92/97. Following the transfer of ownership, it will be the responsibility of Bengalla Mine to operate and rehabilitate the area.

As soon as reasonably practicable following removal of the existing rail loop and associated infrastructure within the footprint of the Bengalla Mine, initial rehabilitation will be undertaken so the area does not pose an ongoing material source of dust emissions.

Initial rehabilitation will include levelling/reforming the infrastructure area, followed by sowing of a sterile cover crop and/or application of a dust suppressant. The MPO rail spur erosion and sediment control water management structures (e.g. sediment fences) within the footprint of Bengalla Mine will be left in place, subject to the agreement of Bengalla Mine.

7.2.6 Progressive Disturbance and Rehabilitation during the MOP/RMP term

In accordance with the MOP Guidelines, a summary of disturbance for the MOP/RMP term is provided in Table 7-3.

Table 7-3
Progressive Disturbance and Rehabilitation during MOP/RMP Term

Year	Total Disturbance Area (ha)	Total Rehabilitation Area (ha)	Comments/Explanation
Start of MOP/RMP Term (1 July 2019) (Plan 2)	1,163	9	Disturbance areas include the Fines Emplacement Area, Infrastructure Areas, Water Management Areas, Active Pits/Voids and Overburden Emplacement Area (Plan 2). Rehabilitation commenced in the south-eastern extent of the Eastern Out of Pit Overburden Emplacement (lower batters).

Table 7-3
Progressive Disturbance and Rehabilitation during MOP/RMP Term

Year	Total Disturbance Area (ha)	Total Rehabilitation Area (ha)	Comments/Explanation
End of Year 1 (30 June 2020) (Plan 3A)	1,339	59	Continued development of the active pit and Overburden Emplacement areas to the north. Continued rehabilitation of eastern outer batters of the Eastern Out of Pit Overburden Emplacement (lower and mid batters).
End of Year 2 (30 June 2021) (Plan 3B)	1,351	118	Continued development of the active pit and Overburden Emplacement areas to the north. Continued rehabilitation of eastern outer batters of the Eastern Out of Pit Overburden Emplacement (lower and mid batters).
End of Year 3 (30 June 2022) (Plan 3C)	1,389	134	Continued development of the active pit to the north-west and within ML 1709. Continued rehabilitation of eastern outer batters of the Eastern Out of Pit Overburden Emplacement (lower and mid batters).
End of Year 4 (30 June 2023) (Plan 3D)	1,398	158	Continued development of the active pit to the south-west, encompassing north-western infrastructure areas. Continued rehabilitation of eastern outer batters of the Eastern Out of Pit Overburden Emplacement (lower and mid batters). Existing rail loop, product loading and water supply infrastructure corridor south of Wybong Road (within the Bengalla Mine approved disturbance boundary) decommissioned.
End of Year 5 (30 June 2024) (Plan 3E)	1,400	181	Continued development of the active pit to the south-west, encompassing western infrastructure areas. Continued rehabilitation of eastern outer batters of the Eastern Out of Pit Overburden Emplacement (lower, mid and upper batters). Existing rail loop, product loading and water supply infrastructure corridor south of Wybong Road (within the Bengalla Mine approved disturbance boundary) decommissioned.

7.3 SUMMARY OF REHABILITATION AREAS DURING THE MOP/RMP TERM

Table 7-4 summarises the changes in the size of rehabilitation areas in each domain for the duration of the MOP/RMP term. Table 7-4 reflects the following (as described in Section 2.6):

- Construction of the Fines Emplacement Area is now complete and is an active operational landform.
- The Active Mine Void has commenced in the south-east corner of the MPO area, and will move north and west steadily throughout the MOP/RMP term.
- The Overburden Emplacement will continue to be developed during the MOP/RMP term. Progressive rehabilitation of the Overburden Emplacement will also occur as areas become available for rehabilitation.

Table 7-4
Rehabilitation Data Table

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area Start of MOP/RMP (ha)	Area End of MOP/RMP (ha)
Infrastructure (1)	Native Woodland/ Grassland (D)	1C	Active	544	399
			Decommissioning	0	86
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem Sustainability	0	0
			Rehabilitation Complete	0	0
Fines Emplacement Area (2)	Agricultural Land (C)	2C	Active	83	83
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem Sustainability	0	0
			Rehabilitation Complete	0	0
Water Management Area (3)	Water Infrastructure and Storage (B)	3B	Active	121	141
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem Sustainability	0	0
			Rehabilitation Complete	0	0

Table 7-4 (Continued)
Rehabilitation Data Table

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area Start of MOP/RMP (ha)	Area End of MOP/RMP (ha)
Active Void (4)	Final Void (A)	4A	Active	183	411
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem Sustainability	0	0
			Rehabilitation Complete	0	0
Overburden Emplacement (5)	Agricultural Land (C)	5C	Active	0	0
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	0	0
			Ecosystem Sustainability	0	0
			Rehabilitation Complete	0	0
Overburden Emplacement (5) (continued)	Native Woodland/ Grassland (D)	5D	Active	223	101
			Decommissioning	0	0
			Landform Establishment	6.5	18
			Growth Medium Development	0	0
			Ecosystem and Land Use Establishment	2.5	162
			Ecosystem and Land Use Sustainability	0	0
			Rehabilitation Complete	0	0

7.4 RELINQUISHMENT PHASE ACHIEVED DURING MOP/RMP TERM

No lands are proposed for relinquishment during the term of this MOP/RMP.

8 REHABILITATION MONITORING AND RESEARCH

Rehabilitation is an iterative process which allows activities to be defined and improved upon throughout the lifetime of the mine. Monitoring of rehabilitation successes and failures will enable lessons learnt in early years of rehabilitation to be applied in subsequent and later years. It will also assist with continuous improvement in the site's performance in terms of landscape and land use. An example of an iterative, continual improvement approach to mine site rehabilitation which may be implemented is shown in Figure 8-1 (based on Nichols, 2005).

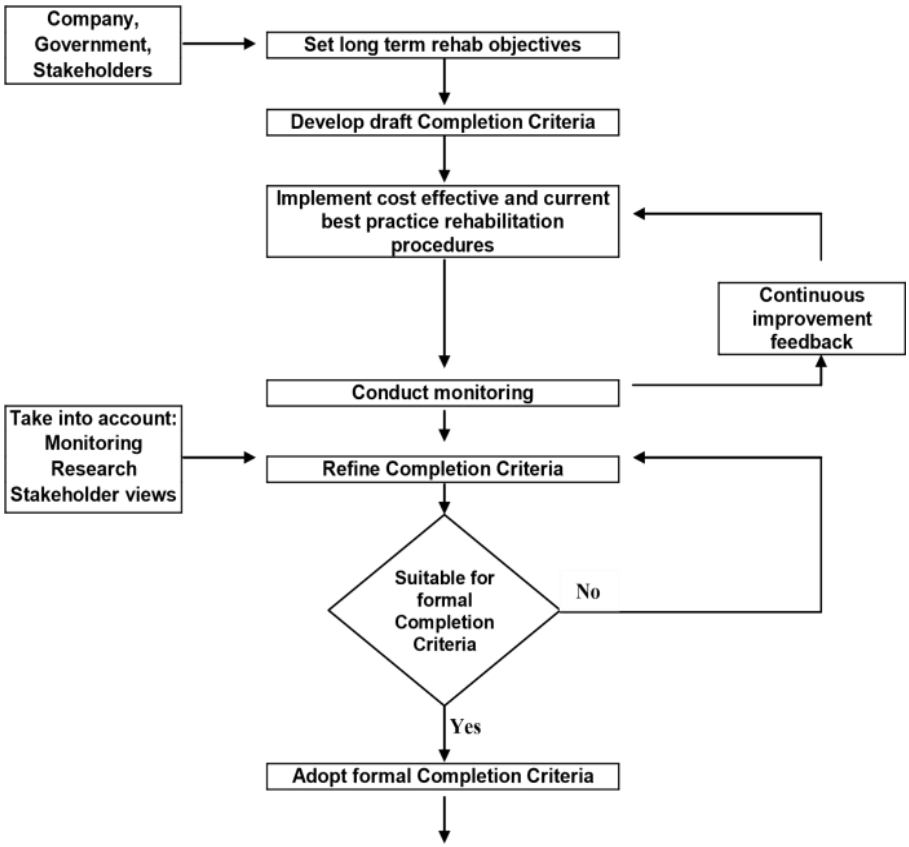

Figure 8-1: Continuous Improvement including Monitoring and Review Processes (Source: after Nichols, 2005)

8.1 MONITORING

A rehabilitation monitoring program will be implemented based on the performance indicators and completion criteria described in Section 6. The monitoring program described in this MOP/RMP will be the responsibility of the Environmental Superintendent (Section 11.2). Details of rehabilitation performance will be reported in the Annual Review.

Where necessary, rehabilitation procedures will be amended based on the monitoring results, to continually improve rehabilitation standards.

The rehabilitation monitoring program will be based on the following methodologies:

- Specifications for Ecosystem Function Analysis (Section 8.1.1).
- Visual Assessment of Revegetated Areas (Section 8.1.2).
- Low intensity agriculture monitoring programme (Section 8.1.3).

8.1.1 Ecosystem Function Analysis

The objective of this component of the monitoring program is to evaluate the progress of rehabilitation towards fulfilling long-term land use objectives and completion criteria. Monitoring of rehabilitation areas will be undertaken annually[1] to:

- compare monitoring results against rehabilitation objectives, performance indicators and completion criteria;
- identify possible trends and areas for improvement;
- link to records of rehabilitation to determine causes and explain results;
- assess effectiveness of environmental controls implemented;
- where necessary, identify modifications required for the monitoring program, rehabilitation practices or areas requiring research;
- compare flora species present against original seed mix and/or reference sites;
- assess vegetation health;
- assess vegetation structure (density of upper, mid and lower storey); and
- where applicable, assess native fauna species diversity and the effectiveness of habitat creation for target fauna species.

Where necessary, rehabilitation procedures will be amended based on rehabilitation monitoring results to continually improve rehabilitation standards, or as more data becomes available regarding reference sites or the targeted vegetation community, completion criteria can be updated to ensure rehabilitation is improving on the right trajectory.

The methodology used to undertake this monitoring is Ecosystem Function Analysis (EFA). EFA consists of the Landscape Function Analysis (LFA) tool and vegetation assessment.

LFA assesses the landscape's ability to retain water and nutrients within the system. In terms of LFA, a soil landscape that is on a self-sustaining trajectory toward (in context of vegetative cover and soil stability) will have (Tongway and Hindley, 2004):

- A high Landscape Organisation Indicator (LOI) (i.e. a low number of bare soil patches, referred to as inter-patches, between obstruction components, referred to as patches, in the soil landscape).
- High Soil Surface Assessment indices, indicating that the site had favourable Nutrient, Infiltration and Stability characteristics.

Vegetation monitoring components are the other component of the EFA monitoring tool. This component is limited to the woodland areas, as woody vegetation is typically not represented within pasture areas.

An assessment of woody species density, species richness and canopy cover all contribute to the findings of the LFA in terms of available nutrients, soil stability and water infiltration. In terms of vegetation dynamics, a soil landscape that is on a self-sustaining trajectory in the context of vegetative cover will generally have:

- high percentage ground cover vegetation and/or leaf litter components with a corresponding low percentage of bare soil areas;

[1] Monitoring may be undertaken at an alternative frequency if a suitably qualified and experienced person considers that annual monitoring is not required for a particular area of rehabilitation. For example, very early or advanced rehabilitation may not progress sufficiently on an annual basis to warrant annual formal monitoring.

- high percentage canopy cover;
- high density of woody species; and
- high species richness (particularly pertinent to habitat complexity components).

Utilising the EFA method, scientifically robust data is provided on the rehabilitation sites which, when compared to the data collected from analogue sites, accurately reflects if the site is on a self-sustaining trajectory. The interpretation of this data enables the development of land management recommendations to address those sites having lower EFA rankings.

Permanent transects will be established in rehabilitation areas and in relevant undisturbed areas to provide analogue/reference sites in accordance with the MPO's Rehabilitation Procedure. The analogue sites will be selected to represent the slope, aspect and proposed vegetation characteristics of the revegetation areas. The analogue sites will provide data on the performance indicators and completion criteria for the revegetation area. Once the analogue sites have been established in areas of the relevant PCTs to be targeted for rehabilitation, the location of the analogue sites will be incorporated into this MOP/RMP and reported in the Annual Review.

8.1.2 Rapid Visual Assessment of Revegetated Areas

Following commencement of rehabilitation, MACH Energy will implement an annual[2] rehabilitation inspection to evaluate how successful the rehabilitation works have been. The scope of the inspection is to include all existing and recently completed rehabilitation areas on-site.

This annual inspection will be undertaken by a visual monitoring technique. Visual monitoring is a field-based rapid assessment tool that provides a qualitative assessment to various landscape contributors including:

- vegetation components (overstorey, understorey ground cover, and pasture development where applicable);
- presence of exotic weed and feral animal species;
- surface stability and erosion issues;
- presence of available microhabitat; and
- disturbance factors.

Each of these subcomponents is awarded a score to generate an overall result for each site. This allows comparison between different sites and over time. It also allows the identification of areas requiring remediation as indicated by low scores.

In terms of visual monitoring, a landscape that is on a self-sustaining trajectory will ideally have:

- diversity of overstorey and understorey vegetative components which are mature and reproducing;
- diversity of ground cover components with good soil coverage and leaf litter contribution;
- comparable pasture development and diversity of species to grazing areas in the region;
- lack of weeds and/or site disturbance associated with feral animal activity;
- stable surface nature with organic matter (i.e. topsoil with organic content);

[2] Monitoring may be undertaken at an alternative frequency if a suitably qualified and experienced person considers that annual monitoring is not required for a particular area of rehabilitation. For example, very early or advanced rehabilitation may not progress sufficiently on an annual basis to warrant annual formal monitoring.

- lack of features attributable to erosion;
- lack of soil compaction and slow to nil water runoff;
- available microhabitat components; and
- lack of disturbance factors, including unauthorised access, rubbish and physical disturbance, such as fire or vandalism.

8.1.3 Low Intensity Agricultural Land Monitoring

Monitoring of areas proposed for low intensity agricultural end land uses (i.e. grazing) would include a range of parameters including soil, water supply and pasture parameters and may include livestock parameters (when adequately advanced). Table 8-1 provides the proposed parameters to be measured for the Low Intensity Agricultural Land monitoring programme.

Table 8-1
Low Intensity Agricultural Land Monitoring Programme

Agricultural Land Aspect	Parameter
Soil	pH, Phosphorus, Nitrogen, Sulphur, Potassium, Calcium, EC/Salinity, Sodicity, Cation Exchange Capacity, Organic Carbon, and some trace elements (e.g. Copper) on advice from Agronomist.
Water Supply	pH, EC/Salinity, and potentially toxic elements on advice from Agronomist (e.g. Iron, Magnesium and Nitrates).
Pasture	Dry matter yield, pasture quality (e.g. Protein, Digestibility, Metabolisable Energy), ground cover, species composition and LFA indices.
Livestock (when adequately advanced)*	Weight, health (i.e. blood testing).

* Adequately advanced is when an Agronomist is satisfied that all other monitoring parameters indicate the landform is stable, pasture development is comparable to analogue sites, and the soil, water and pasture is safe for livestock.

8.2 RESEARCH

The rehabilitation program at the MPO will focus on research and management practices that are designed to enhance the woodland communities established across the rehabilitated landscape.

MACH Energy proposes to build on industry research results to re-establish woodland. Details of the research may include:

- Potential variables impacting on rehabilitation programs and causes of failure.
- Assessing rehabilitation strategies that have successful reinstated woodland communities (or rehabilitation with species typical of various communities) on other mine sites, including:
  - establishing appropriate soil substrate: direct application of topsoil; stockpiled native topsoil; raw overburden and interburden material plus addition of biosolids/organic growth medium; addition of other organic material; rehabilitation trials on tailings material;
  - establishment of the grassy understorey: grass species suitable for mine rehabilitation; low and high photosynthetic pathway species; establishing native herbs and forbs;
  - establishing the shrubby understorey;
  - establishing the overstorey;

- seed distribution methods: hand-broadcasting; brush-matting; hydro-mulching; spreading seed-bearing hay; direct seeding; air seeding; and
- progressive rehabilitation strategy: pre-stripping requirements; sequence of rehabilitation strategies.

There have been proven successes in rehabilitating mined lands using similar techniques to those described above within the industry. As described in Section 3.2.1, MACH Energy will continue to conduct geochemical characterisation of soils and overburden materials as mining progresses to inform selective handling of materials. Investigations (including soil testwork) will also be undertaken to assess the characteristics of replaced soil and assess its suitability for rehabilitation of Class 4, 5 and 6 Land Capability agricultural lands, as determined by a Certified Professional Soil Scientist. The outcomes of the rehabilitation trials will be used to refine the rehabilitation program at the MPO.

Various ecological works have been undertaken at the MPO prior to the MOP/RMP term, including as part of the GDP process, and as part of flora surveys and assessments for the two recent modifications lodged with the DPE (i.e. MOD 3 and MOD 4). These works included mapping vegetation communities, searches for threatened flora species, communities and populations, and detailed floristic data collection at numerous survey plots.

With the final landform design currently undergoing review and improvement (the subject of planned submission of a State Significant Development application) MACH Energy is not yet in a position to select detailed analogue sites. Notwithstanding, in undertaking the ecological works referenced above, MACH Energy is building an extensive knowledge of the characteristics of the MPO site and surrounding area. As the design of the more accurate final landform is refined, MACH Energy will have a more accurate understanding of the type of analogue sites required to be monitored (i.e. in terms of flora species mix, vegetation types, landforms etc.).

9 INTERVENTION AND ADAPTIVE MANAGEMENT

9.1 THREATS TO REHABILITATION

As described in Section 3.1, an environmental risk assessment was conducted to identify and assess the environmental risks associated with the MPO, in particular the risks to successful rehabilitation of the MPO. Management of the key risks to rehabilitation is discussed in Section 3.2.

9.2 TRIGGER ACTION RESPONSE PLAN

The following TARP identifies the proposed contingency strategies in the event of unexpected variations or impacts to rehabilitation outcomes. A risk-based approach has been used to assess the potential consequences and mitigation measures in terms of the Consequence Category – Environment.

The key risks associated with site rehabilitation have been assessed using the likelihood ratings, maximum reasonable consequence ratings, risk matrix and classifications presented in Section 3.1.

Table 3-5 outlines the key identified risks and associated risk ratings. The ratings assume that the risks are untreated (i.e. have not been addressed by specific risk mitigation measures other than routine design and operational practice). Proposed mitigation measures to reduce the identified risks are outlined in Table 9-1.

Table 9-1
Proposed Mitigation Measures to Reduce Key Risks

Domain	Threat to Rehabilitation Success	Trigger	Action/Response to Mitigate, Remediate and/or Compensate any Identified Impacts	How Impact will be Monitored	Notification Protocol
All	Inappropriate bushfire management regime leading to impact on rehabilitation areas.	Occurrence of bushfire in rehabilitation area results in loss of revegetation.	Selection of fire-tolerant species for revegetation and rehabilitation and adoption of standard fire prevention measures. Implementation of the MPO Bushfire Management Plan, which includes procedures such as mosaic burning and monitoring of areas following fires, with follow-up replanting/reseeding if indicated by monitoring results. Maintain contingency supplies of seed for key native species. Maintain adequate site emergency response capacity. Implementation of hot works permitting systems. Restricting slashing activities in hot and dry weather. Maintaining consultation/liaison with the NSW Rural Fire Service (RFS) and other relevant agencies.	Regular visual inspection of rehabilitated areas and surrounds and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.
	Major storm event resulting in flooding, geotechnical instability, major erosion and/or widespread damage to rehabilitated area.	Rehabilitation monitoring indicates widespread damage to rehabilitation area as a result of major storm event.	Design final landforms, structures and revegetation to cope with major storm events. Monitoring of rehabilitation areas following a major storm and replanting/reseeding as necessary.	Regular visual inspection of rehabilitated areas and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.

Table 9-1 (continued)
Proposed Mitigation Measures to Reduce Key Risks

Domain	Threat to Rehabilitation Success	Trigger	Action/Response to Mitigate, Remediate and/or Compensate any Identified Impacts	How Impact will be Monitored	Notification Protocol
All (continued)	Severe and/or prolonged drought leading to widespread failure of revegetation/rehabilitation.	Rehabilitation monitoring indicates revegetation species failure as a result of drought conditions.	Selection of drought-tolerant species within species mix for revegetation and rehabilitation. Monitoring of rehabilitation areas and replanting/reseeding as necessary. Maintain contingency supplies of seed for key native species.	Regular visual inspection of rehabilitated areas and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.
	Inadequate or insufficient topsoil to create/enhance the desired ecological communities in mine rehabilitation areas.	Rehabilitation planning and review of topsoil inventory indicates insufficient topsoil resources to create/enhance the desired ecological communities.	Develop procedures for topsoil management, overburden and substrate management and soil testing. Assess stripped topsoil for weed contamination and limit spread of weed contaminated topsoil on or near areas of good native groundcover. Soil type matched to enhanced or rehabilitated vegetation association. Subsoil material assessed for use as a suitable growing media. Identify soil ameliorants (e.g. biosolids) that could be used as a topsoil substitute.	Regular stocktake of topsoil inventory. Regular visual inspection of remediated area and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.
	Inadequate weed and pest animal control leading to widespread failure of revegetation or continued sustainability of rehabilitation area ecosystems.	Rehabilitation monitoring indicates revegetation failure as a result of significant weed infestation and/or pest animals.	Targeted weed management and control program developed and implemented. Pest animal management and control program developed and implemented (including pest proof fencing if necessary). Educate persons undertaking weed control to the major weed threats in the area and on-site. Visual inspections/cleaning of vehicles entering sensitive areas to mitigate risk of weed dispersal. Consider restricting access to rehabilitation areas.	Regular visual inspection of remediated area and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.

Table 9-1 (continued)
Proposed Mitigation Measures to Reduce Key Risks

Domain	Threat to Rehabilitation Success	Trigger	Action/Response to Mitigate, Remediate and/or Compensate any Identified Impacts	How Impact will be Monitored	Notification Protocol
All (continued)	Insect attacks (e.g. locusts and beetles) leading to failure of rehabilitation or continued sustainability of mine rehabilitation area ecosystems.	Rehabilitation monitoring indicates failure as a result of significant insect attacks.	Planting to avoid insect prone periods. Use of endemic species that are suited to localised insect predation (where practical). Monitoring program results to identify if further plantings required.	Regular visual inspection of remediated area and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.
	Inappropriate topsoiling, planting and/or direct seeding techniques resulting in a failure of rehabilitation.	Rehabilitation monitoring indicates die-back and/or poor growth.	MPO mine planning group (with input from environmental professionals) to conduct site investigation and review active mining and rehabilitation methodology records for the area, to determine possible contributing factors. Investigation to include review of landform construction methods, topsoil used (location, term topsoil was stored, depth) and seed mix used. Implement mitigation measures relevant to identified contributing factors/cause. Implement appropriate pest and weed control (if relevant to event). Ensure appropriate storage/use of topsoil and appropriate seed mix use. Review life-of-mine topsoil balance and soil storage and management measures.	Regular visual inspection of remediated area and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.

Table 9-1 (Continued)
Proposed Mitigation Measures to Reduce Key Risks

Domain	Threat to Rehabilitation Success	Trigger	Action/Response to Mitigate, Remediate and/or Compensate any Identified Impacts	How Impact will be Monitored	Notification Protocol
All (continued)	Inappropriate fertiliser application (type and/or rate) leading to failure of revegetation or rehabilitation.	Rehabilitation monitoring indicates poor/slow growth and development of revegetation.	Review fertiliser application program consistent with revegetation requirements.	Regular visual inspection of remediated area and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.
	Frost leads to high mortality rates of revegetation and rehabilitation.	Rehabilitation monitoring indicates high mortality rates of revegetation and rehabilitation as a result of frost.	Monitoring program results to identify if further plantings required. Maintain contingency supplies of seed of key rehabilitation program species.	Regular visual inspection of remediated area and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.
	Incompatible neighbouring landowner practices (including interactions with the Bengalla Mine and adjoining private landholders) leading to failure of rehabilitation and revegetation works.	Rehabilitation monitoring indicates failure of rehabilitation and revegetation work, likely as a result of neighbouring land-owner practices.	Communicate the rehabilitation objectives and land use goals with neighbouring properties, the CCC and the local community.	Ongoing/follow-up communications with neighbouring land owners and the CCC.	Reporting in ML Rehabilitation Report and the Annual Review.
	Planning - insufficient provision of financial, human and equipment resources leading to failure to meet completion criteria, including increased maintenance costs and timeframe.	Rehabilitation planning indicates insufficient resources to meet completion criteria.	Budgetary allocation sufficient to cover requirements with resources available to implement rehabilitation objectives.	Internal rehabilitation planning procedures.	Internal notification procedures.

Table 9-1 (Continued)
Proposed Mitigation Measures to Reduce Key Risks

Domain	Threat to Rehabilitation Success	Trigger	Action/Response to Mitigate, Remediate and/or Compensate any Identified Impacts	How Impact will be Monitored	Notification Protocol
	Inadequate or insufficient (incorrect species mix/quality) seed/seedlings for rehabilitation works.	Rehabilitation planning indicates potential for insufficient seed/seedling resources.	Develop a seed supply strategy to ensure adequate seed/seedling quantities of the relevant species are available for upcoming rehabilitation campaigns. Identify suitable alternate seed/seedling sources from within the general locality. Identify the requirement to engage a suitably qualified ecologist/specialist to review species lists, based on resources available.	Ongoing rehabilitation planning procedures.	Reporting in ML Rehabilitation Report and the Annual Review.
	Inadequate erosion and sediment control leading to erosion and/or landform failure.	Rehabilitation monitoring indicates areas of rehabilitation or landform failure due to active erosion.	Implement MPO ESCP. Conduct site investigation and review rehabilitation methodology records for the area, to determine possible contributing factors. Investigation and review to include: • Review site water management system and implement necessary controls to provide required directions of flow. • Conduct soil testing to confirm stability of landform materials (if considered necessary to the event). • Inspect/confirm erosion and sediment structures installed/constructed in accordance with the Blue Book. • Review rehabilitation methodology records for the area and confirm if adequate macro and microrelief has been incorporated into rehabilitation area.	Regular visual inspection of rehabilitated areas and ongoing rehabilitation monitoring using LFA methodology. Conduct regular inspections of erosion and sediment control structures including inspections by a certified technical erosion and sediment control professional.	Reporting in ML Rehabilitation Report and the Annual Review.

Table 9-1 (Continued)
Proposed Mitigation Measures to Reduce Key Risks

Domain	Threat to Rehabilitation Success	Trigger	Action/Response to Mitigate, Remediate and/or Compensate any Identified Impacts	How Impact will be Monitored	Notification Protocol
All (continued)	Not implementing rehabilitation activities in accordance with MPO rehabilitation requirements leading to inability to achieve landform and biodiversity goals.	Review of rehabilitation progression indicates area of completed rehabilitation does not generally align with rehabilitation commitments in the MOP.	MPO mine planning group (with input from environmental professionals) to review sequencing of mining and rehabilitation activities. Conduct monthly and weekly review and reporting of the rehabilitation progress. Review management methods for carbonaceous waste in pit.	Ongoing rehabilitation planning and review procedures with input from environmental professionals.	Reporting in ML Rehabilitation Report and the Annual Review.
	Inappropriate species selection, topsoil/seed quality and timing resulting in a failure of achieving rehabilitation species/plant community requirements.	Rehabilitation monitoring indicates established rehabilitation does not align with MOP/RMP species/plant community requirements.	Consult with mining contractor environmental professionals and technical specialists. Conduct regular monitoring of the rehabilitation performance. Ensure appropriate storage/use of topsoil and appropriate seed mix use. Implement seed collection program, pest control and weed management. Demarcate rehabilitation areas and ensure appropriate signage is provided.	Regular visual inspection of rehabilitated areas and ongoing rehabilitation monitoring using LFA methodology.	Reporting in ML Rehabilitation Report and the Annual Review.
Primary Domain 5 – Overburden Emplacement Area	Incorrect acid forming material management procedures resulting in rehabilitation failure.	Rehabilitation monitoring and/or geochemistry monitoring indicates acid forming material is close to the outer surface of the emplacement, resulting in failure of rehabilitation area or revegetation.	Identify suitable non-acid forming material to adequately bury the potentially acid forming material. Consult with a specialist geologist and/or geochemist as required. Implement appropriate mine planning to ensure placement of potentially acid forming material to in-pit locations with 10 meters of coverage.	Ongoing rehabilitation planning and review procedures with input from a geologist and/or geochemist as required.	Reporting in ML Rehabilitation Report and the Annual Review.

10 REPORTING

The following reporting on rehabilitation performance will be undertaken in accordance with Development Consent DA 92/97 requirements, ML requirements and reporting requirements described in relevant approved management plans:

- Annual Review (in accordance with Schedule 5, Condition 3);
- Rehabilitation Report (in accordance with relevant ML conditions);
- Independent Environmental Audit (in accordance with Schedule 5, Condition 9); and
- Regular reporting on the environmental performance of the MPO on the MACH Energy website (in accordance with Schedule 5, Condition 8).

10.1 REPORTING SYSTEMS

In accordance with Condition 2, Schedule 5 of Development Consent DA 92/97, MACH Energy has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in detail in the MPO Environmental Management Strategy.

In accordance with Condition 8, Schedule 5 of Development Consent DA 92/97, MACH Energy will provide regular reporting on the environmental performance of the MPO on the MACH Energy website.

11 REVIEW AND IMPLEMENTATION

11.1 REVIEW

This section describes the protocol for periodic review of the MOP. Reviews are conducted to assess the effectiveness of the procedures against the objectives of MOP. The MOP will be reviewed, and if necessary revised, within three months of the submission of an:

- Annual Review, which has been undertaken as per Schedule 5, Condition 3 of Development Consent DA 92/97;
- Incident report, which has been undertaken as per Schedule 5, Condition 7 of Development Consent DA 92/97;
- Independent Environmental Audit, which has been undertaken as per Schedule 5, Condition 9 of Development Consent DA 92/97; and
- Any modification to the conditions of Development Consent DA 92/97.

This MOP may be reviewed and, if necessary, revised due to:

- a change in the activities or operations associated with the MPO;
- deficiencies of mining and/or rehabilitation activities being identified;
- results from the monitoring and review program;
- recommendations resulting from the monitoring and review program;
- changing project approval requirements;
- significant improvements in knowledge or technology becoming available;
- a change in legislation; and
- risk assessment identifying the requirement to alter the MOP.

Any proposed amendments to the MOP will be undertaken in consultation with the DRG.

11.2 IMPLEMENTATION

Table 11-1 defines personnel who are responsible for the implementation and review of this MOP.

Table 11-1
Responsibilities

Title	Responsibility
Operational Phase	
General Manager Operations	• Implement the mining operations and procedures referenced in this MOP/RMP. • Undertake training in relevant Management Plans and procedures as required. • Provide resources required and support to implement these procedures. • Allow for forward planning to prepare and bulk shape areas.
Environmental Superintendent	• Prepare the relevant Management Plans. • Implement, monitor and review the programs and procedures linked to this MOP/RMP. • Consult with regulatory authorities as required. • Undertake monitoring as required. • Undertake maintenance as required. • Provide measures for continual improvement to this MOP/RMP and procedures. • Ensure all personnel undertaking works in relation to this MOP/RMP are trained and competent. • Report the progress of any rehabilitation in the Annual Review and ML Rehabilitation Report.
Environmental Advisor	• Provide support to Environmental Superintendent responsibilities.

12 REFERENCES

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13 PLANS

The following plans have been prepared in accordance with the MOP Guidelines and are provided within this section:

- Plan 1A – Pre-mining Environment – Project Locality.
- Plan 1B-1 – Pre-mining Environment – Natural Environment – Vegetation Communities.
- Plan 1B-2 – Pre-mining Environment – Natural Environment – Existing Land Use.
- Plan 1C – Pre-mining Environment – Built Environment.
- Plan 2 – Mine Domains at Commencement of MOP/RMP.
- Plan 3A – Mining and Rehabilitation End of Year 1 of MOP/RMP Term (30 June 2020).
- Plan 3B – Mining and Rehabilitation End of Year 2 of MOP/RMP Term (30 June 2021).
- Plan 3C – Mining and Rehabilitation End of Year 3 of MOP/RMP Term (30 June 2022).
- Plan 3D – Mining and Rehabilitation End of Year 4 of MOP/RMP Term (30 June 2023).
- Plan 3E – Mining and Rehabilitation End of Year 5 of MOP/RMP Term (30 June 2024).
- Plan 4A – Indicative Final Rehabilitation and Post-mining Land Use Domains.
- Plan 4B – Conceptual Final Landform – Plan View.
- Plan 5 – Conceptual Final Landform Cross-sections.

MOP PLANS

MAC-16-01 MOP_2019-024 MOP-RMP_Plans_201A

LEGEND

- Mining Operation
- Proposed Mining Operations (Application Lodged)
- Mining Lease Boundary (Mount Pleasant Operation)
- Mining Lease Boundary (Bengalla Coal Mine)
- Railway
- Local Government Boundary
- State Forest
- National Parks and Wildlife Estate

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19

Date

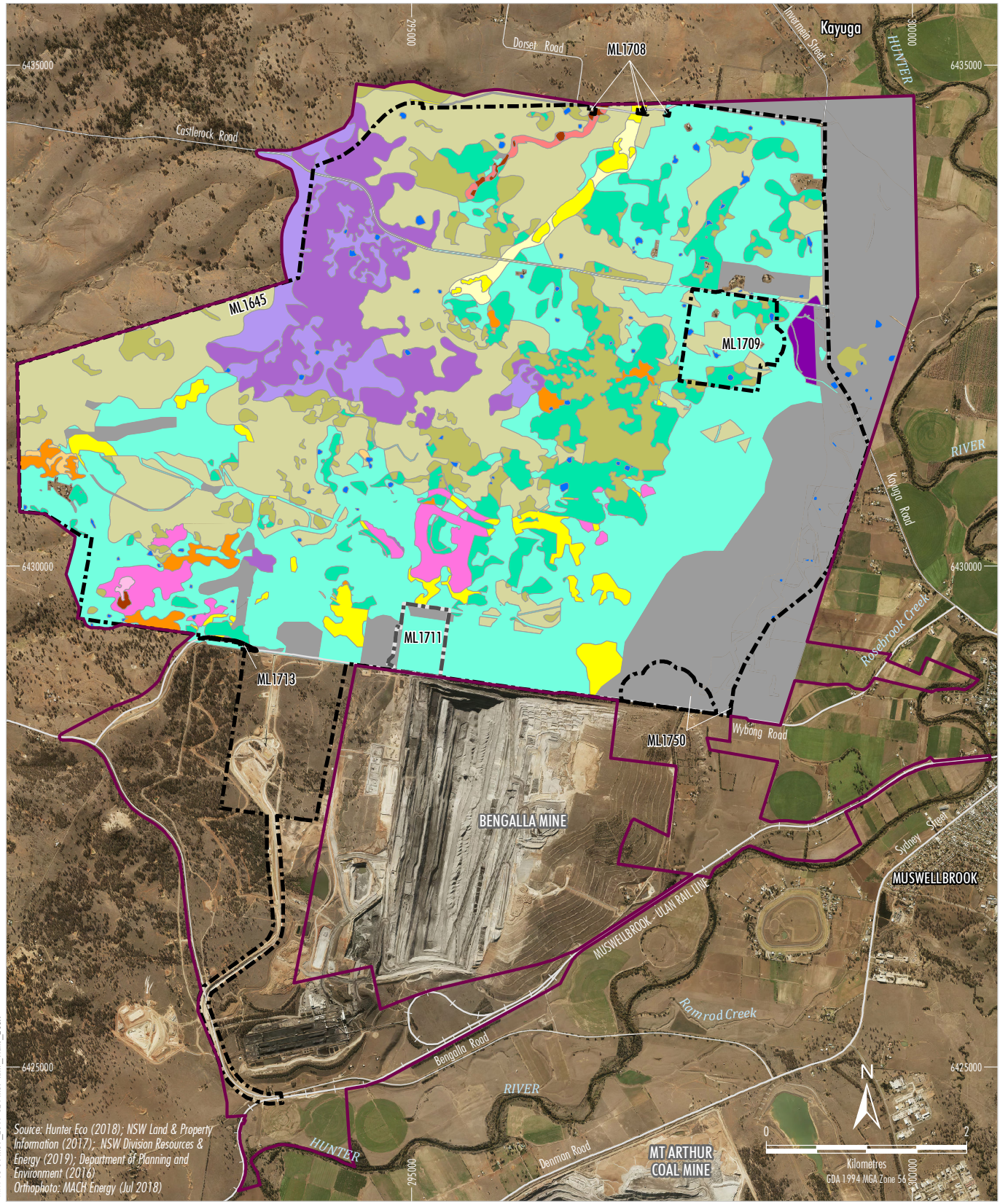
Source: Geoscience Australia (2006); NSW Department Resources & Energy (2019); Office of Environment and Heritage NSW (2016)

MACHEnergy

MOUNT PLEASANT OPERATION

Pre-mining Environment
Project Locality

Plan 1A



Source: Hunter Eco (2018); NSW Land & Property Information (2017); NSW Division Resources & Energy (2019); Department of Planning and Environment (2016). Orthophoto: MACH Energy (Jul 2018)

MAC-16-01 MOP_2019-024 MOP-RAP_Plans_203A

LEGEND

- Modified Development Consent Boundary*
- Mount Pleasant Operation Mining Lease Boundary
- Bengalla Mining Lease Boundary

Vegetation Mapping

- White Box - Narrow-leaved Ironbark - Blakely's Red Gum [DNG] [1]
- White Box - Narrow-leaved Ironbark - Blakely's Red Gum [1]
- Spotted Gum - Narrow-leaved Ironbark Woodland [DNG]
- Spotted Gum - Narrow-leaved Ironbark Woodland [2]
- Spotted Gum - Grey Box x White Box Woodland/Forest [DNG]
- Spotted Gum - Grey Box x White Box Woodland/Forest [2]
- Slaty Box Woodland [DNG]
- Narrow-leaved Ironbark - Grey Box Grassy Woodland [DNG]
- Narrow-leaved Ironbark - Grey Box Grassy Woodland [3]
- Narrow-leaved Ironbark Shrubby Forest [DNG]
- Narrow-leaved Ironbark Shrubby Forest [3]
- Grey Box x White Box Grassy Woodland [DNG] [1]
- Grey Box x White Box Grassy Woodland [1]
- Forest Red Gum Grassy Open Forest [DNG] [1]
- Forest Red Gum Grassy Open Forest [1]
- Non-native
- Dam

[1] TEC Listed BC Act: White Box Yellow Box Blakely's Red Gum Woodland

[2] TEC Listed BC Act: Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions

[3] TEC Listed BC Act: Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions

* Approximate graphical representation of the Schedule of Land presented as Appendix 1 of Development Consent DA 92/97 (as modified on 16 November 2018)

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

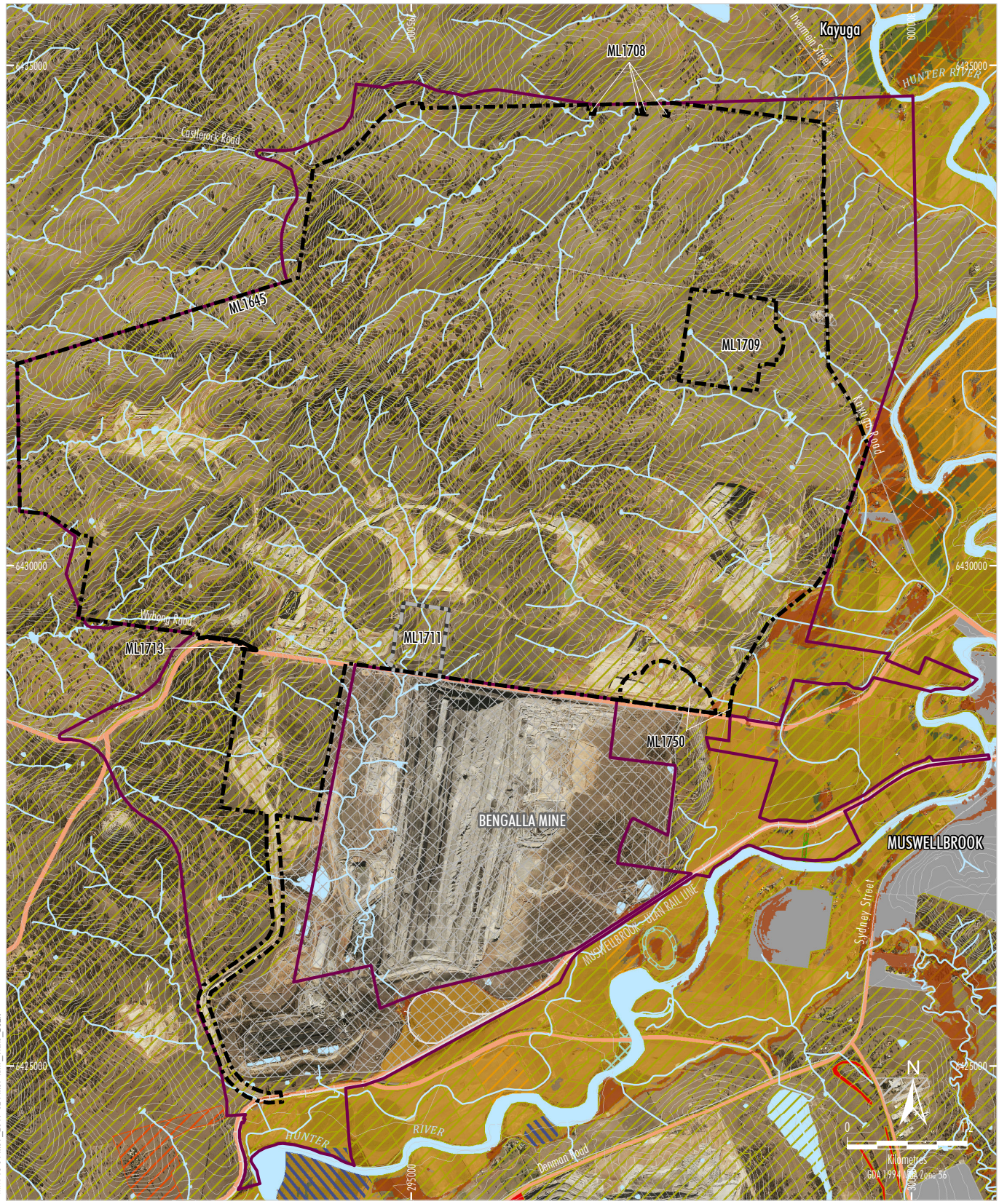
Representative ..... Date 04-06-19

MACHEnergy

MOUNT PLEASANT OPERATION

Pre-Mining Environment
Natural Environment - Vegetation Communities

Plan 1B-1



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LEGEND

Modified Development Consent Boundary *
Mount Pleasant Operation Mining Lease Boundary
Bengalla Mining Lease Boundary

Existing Landuse (OEH, 2016)

- Conservation Area
- Cropping
- Grazing
- Horticulture
- Intensive Animal Production
- Mining & Quarrying
- Power Generation
- River & Drainage System
- Transport & Other Corridors
- Tree & Shrub Cover
- Urban
- Wetland

Muswellbrook 100 Year Flood Hazard Low
Muswellbrook 100 Year Flood Hazard High

* Approximate graphical representation of the Schedule of Land presented as Appendix 1 of Development Consent DA 92/97 (as modified on 16 November 2018)

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19
Date

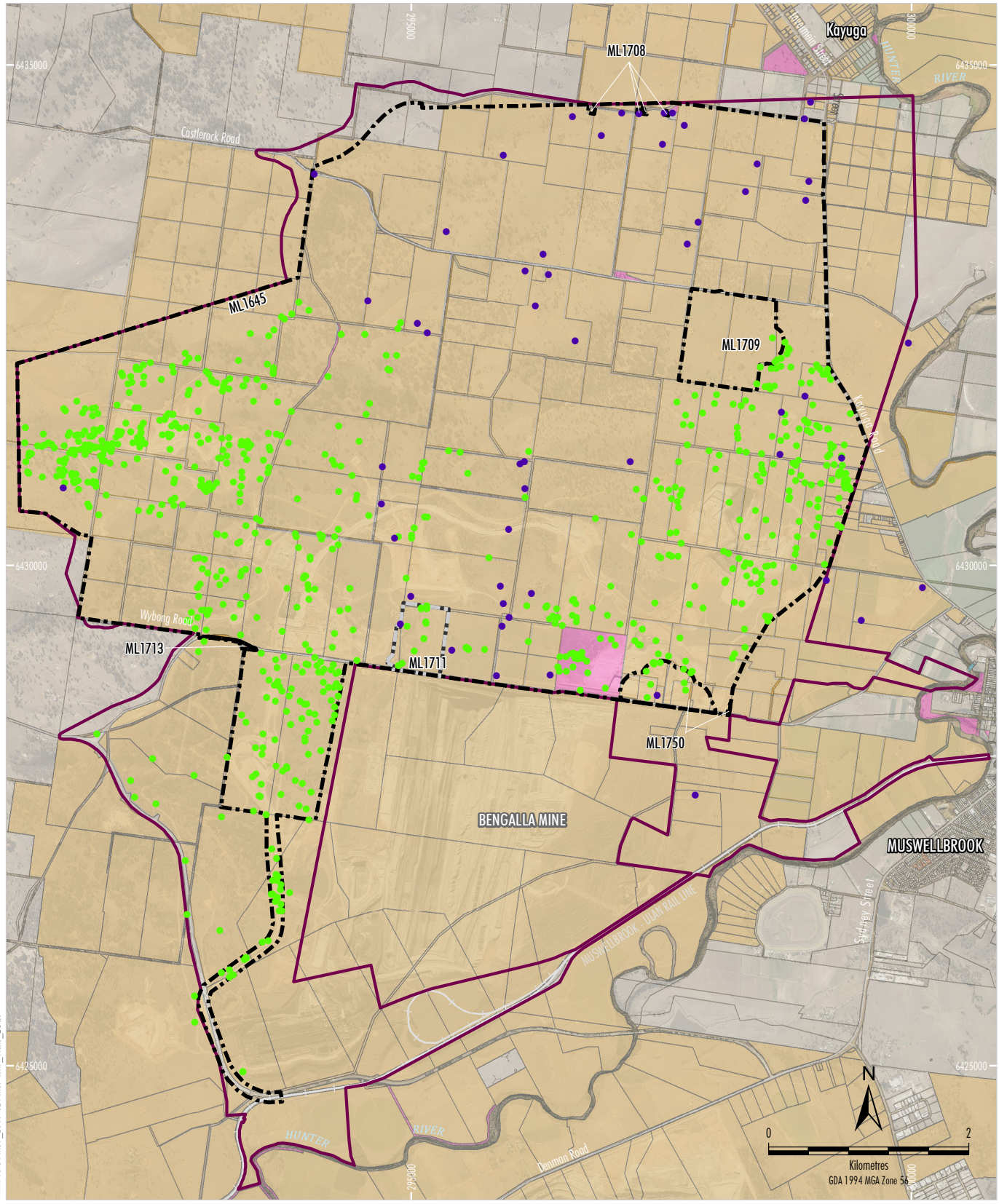
Source: NSW Land & Property Information (2013); NSW Department Resources & Energy (2019); OEH (2016); EMM (2010); Worley Parsons (2014)
Orthophoto: MACH Energy (Jul 2018)

MACHEnergy

MOUNT PLEASANT OPERATION

Pre-mining Environment
Natural Environment - Existing Land Use

Plan 1B-2



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_204A

LEGEND

- Modified Development Consent Boundary*
- Mount Pleasant Operation Mining Lease Boundary
- Bengalla Mining Lease Boundary
- Crown
- Privately-Owned
- Local Government Authority
- NSW Government
- Mine Owned
- Historic Heritage Sites
- Aboriginal Heritage Site

* Appendix 1 of Development Consent DA 92/97

I the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19
Date

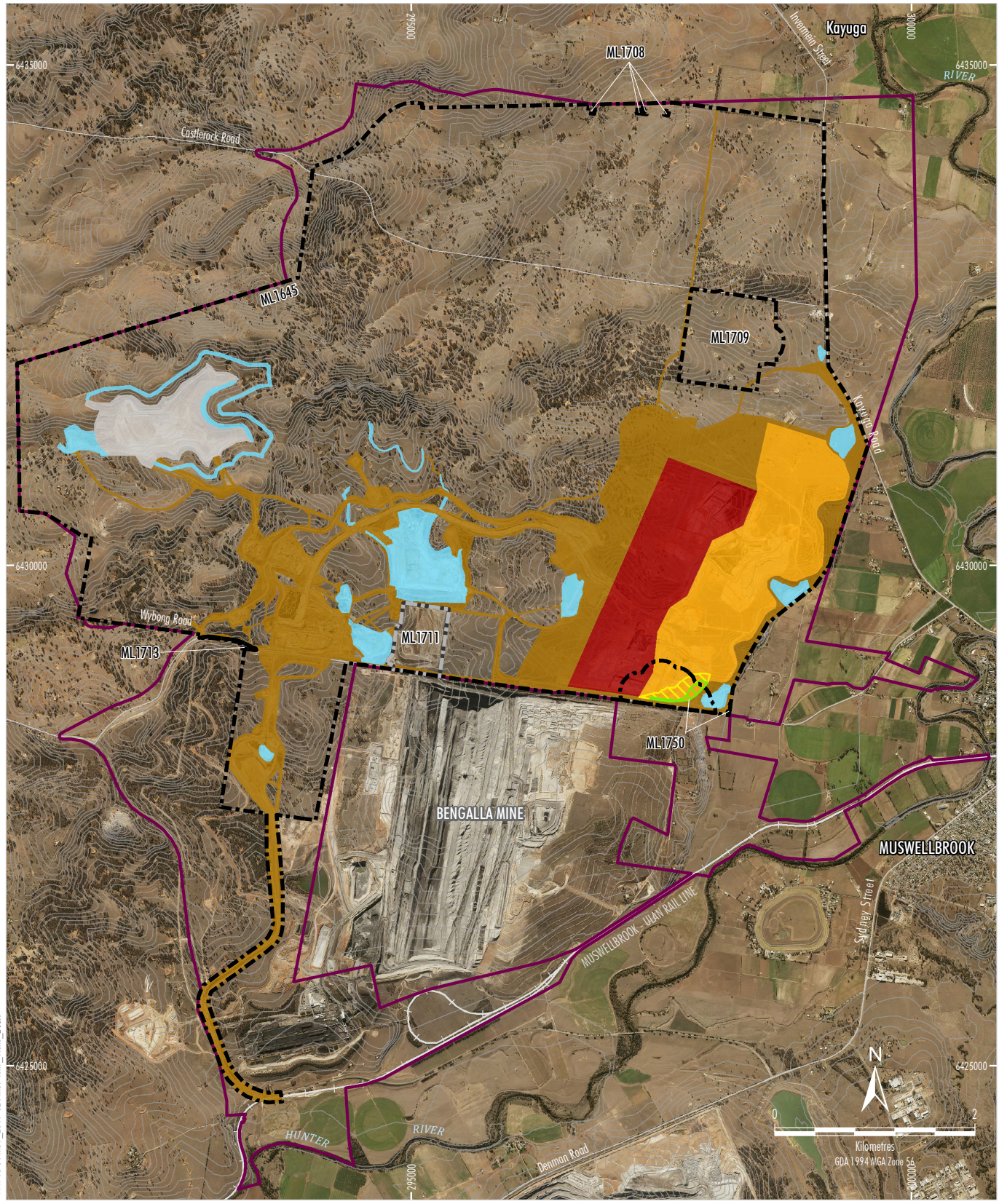
Source: NSW Land & Property Information (2019); NSW Department Resources & Energy (2019); Veritas Archaeology (2014); AHIMS (2016)
Orthophoto: MACH Energy (Jul 2018)

MACHEnergy

MOUNT PLEASANT OPERATION

Pre-mining Environment
Built Environment

Plan 1C



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_2054

LEGEND

Modified Development Consent Boundary*
Mount Pleasant Operation Mining Lease Boundary
Bengalla Mining Lease Boundary
Contour (5m Interval)

Primary Domains

1 Infrastructure Area
2 Fines Emplacement Area
3 Water Management Area
4 Active Void
5 Overburden Emplacement Area

Rehabilitation Phase

Landform Establishment
Ecosystem and Land Use Establishment – Initial Rehabilitation

* Appendix 1 of Development Consent DA 92/97

Source: NSW Land & Property Information (2015); NSW Department Resources & Energy (2019); MACH Energy (2019)
Orthophoto: MACH Energy (Jul 2018)

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

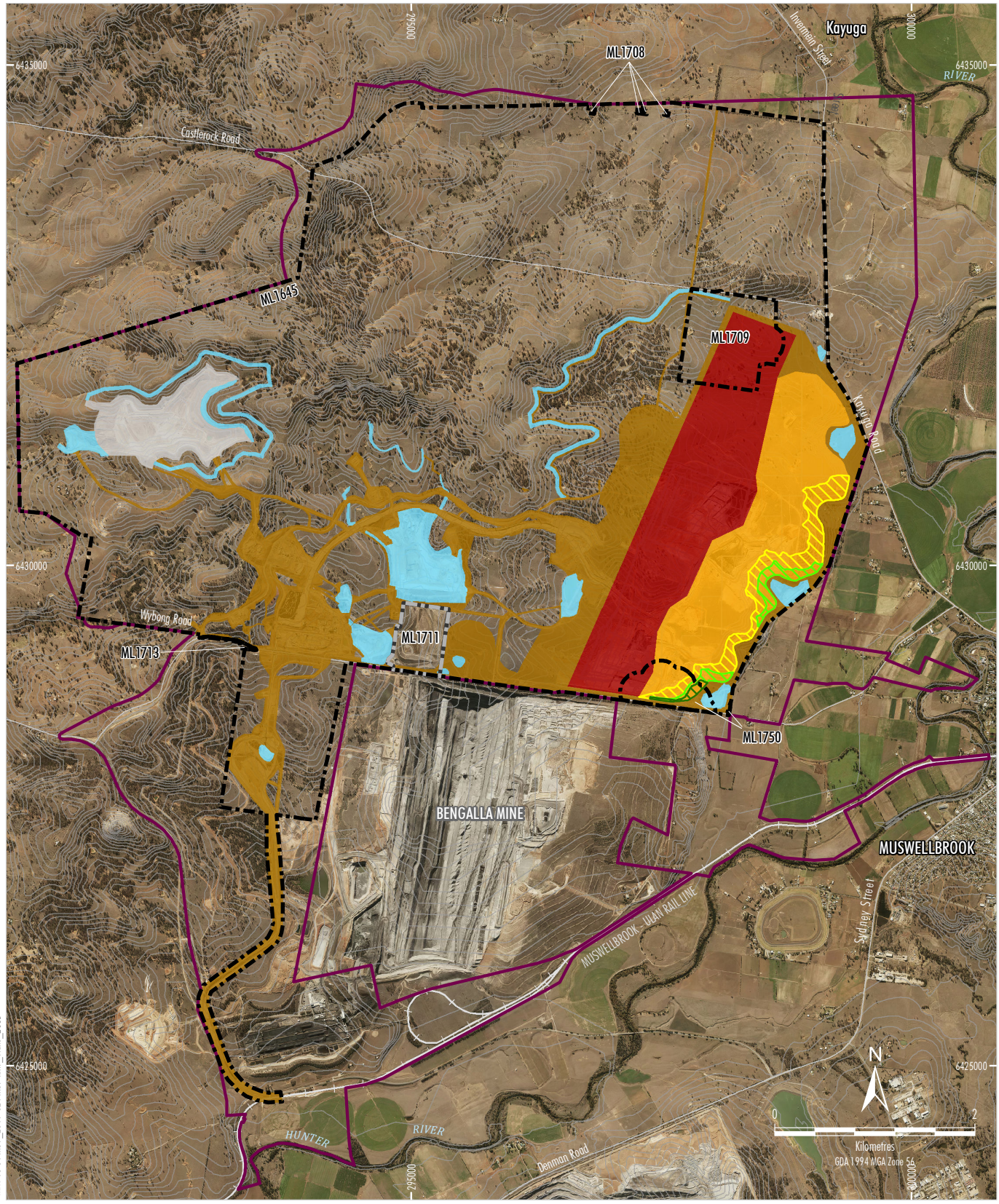
04-06-19
Date

MACHEnergy

MOUNT PLEASANT OPERATION

Mine Domains at Commencement of MOP/RMP

Plan 2



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_2060

LEGEND

- Modified Development Consent Boundary*
- Mount Pleasant Operation Mining Lease Boundary
- Bengalla Mining Lease Boundary
- Contour (5m Interval)

Primary Domains

- 1 Infrastructure Area
- 2 Fines Emplacement Area
- 3 Water Management Area
- 4 Active Void
- 5 Overburden Emplacement Area

Rehabilitation Phase

- Landform Establishment
- Ecosystem and Land Use Establishment – Initial Rehabilitation
- Ecosystem and Land Use Establishment – Established Rehabilitation

* Appendix 1 of Development Consent DA 92/97.
Additional minor operational components not shown e.g. water pipelines, pump station, electricity transmission lines, signalling, access tracks, etc.

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19
Date

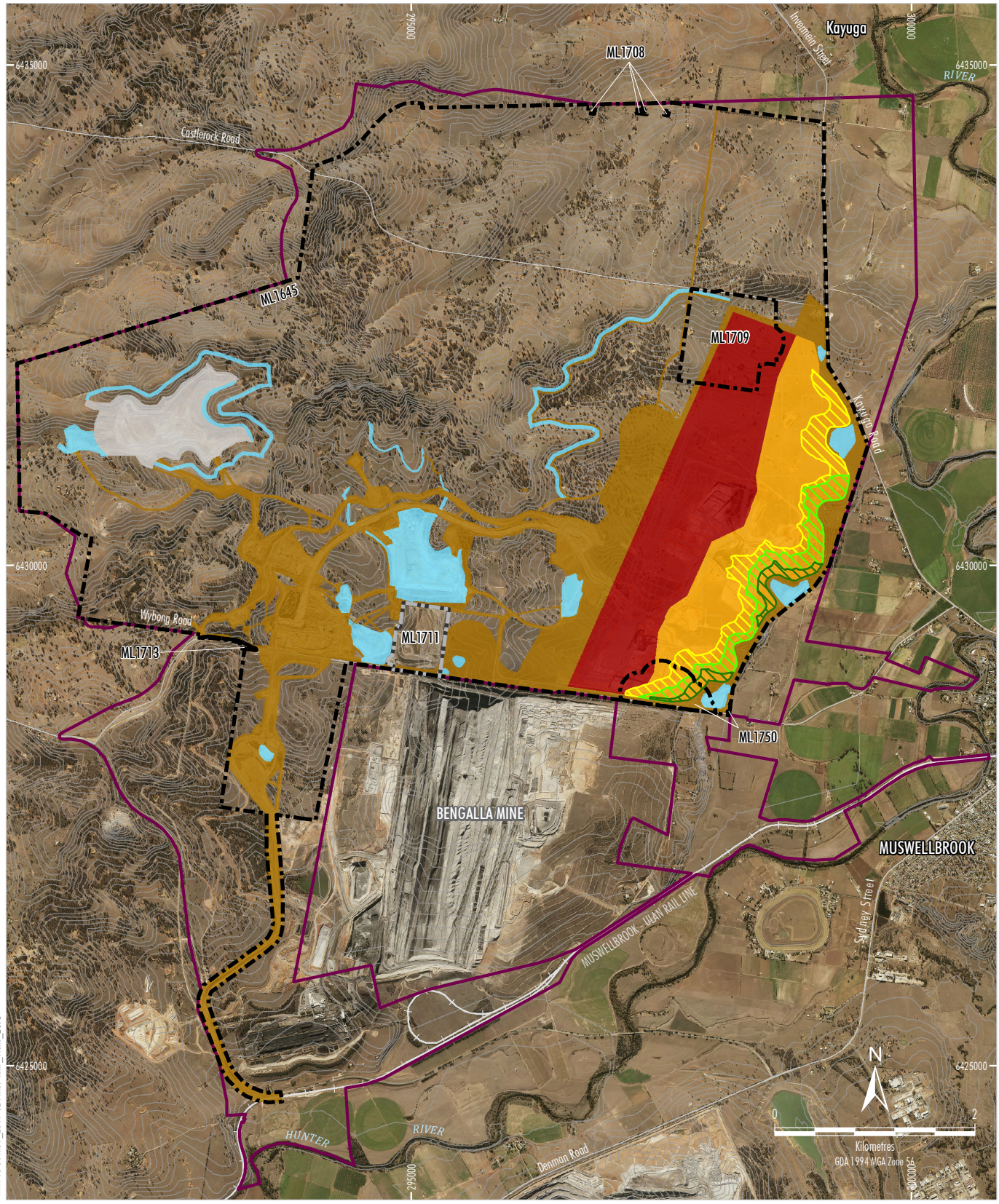
Source: NSW Land & Property Information (2015); NSW Department Resources & Energy (2019); MACH Energy (2019)
Orthophoto: MACH Energy (Jul 2018)

MACHEnergy

MOUNT PLEASANT OPERATION

Mining and Rehabilitation End of Year 1 of MOP/RMP Term (30 June 2020)

Plan 3A



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_207D

LEGEND

- Modified Development Consent Boundary*
- Mount Pleasant Operation Mining Lease Boundary
- Bengalla Mining Lease Boundary
- Contour (5m Interval)

Primary Domains

- 1 Infrastructure Area
- 2 Fines Emplacement Area
- 3 Water Management Area
- 4 Active Void
- 5 Overburden Emplacement Area

Rehabilitation Phase

- Landform Establishment
- Ecosystem and Land Use Establishment – Initial Rehabilitation
- Ecosystem and Land Use Establishment – Established Rehabilitation

* Appendix 1 of Development Consent DA 92/97

Source: NSW Land & Property Information (2015); NSW Department Resources & Energy (2019); MACH Energy (2019)
Orthophoto: MACH Energy (Jul 2018)

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

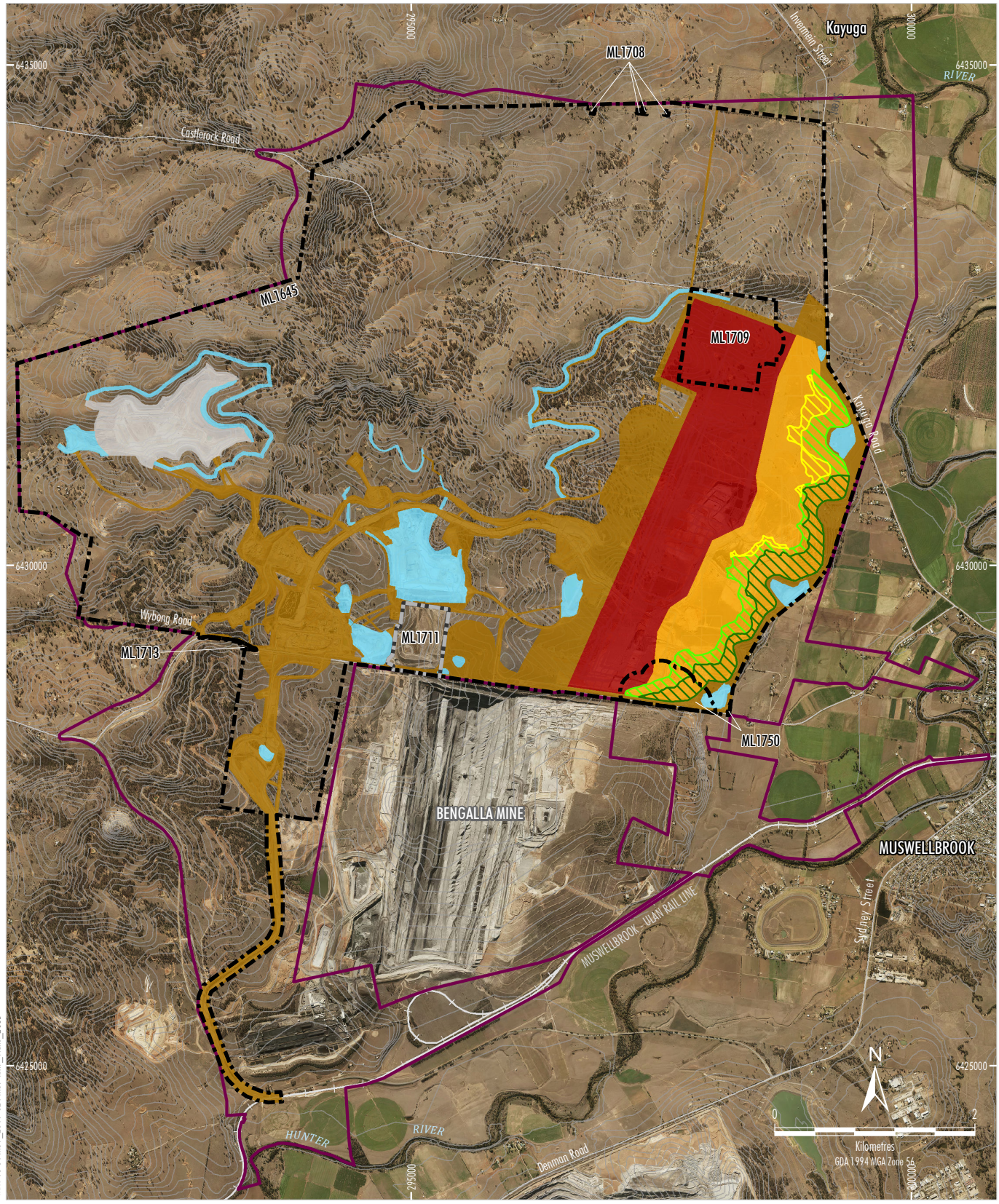
04-06-19
Date

MACHEnergy

MOUNT PLEASANT OPERATION

Mining and Rehabilitation End of Year 2 of MOP/RMP Term (30 June 2021)

Plan 3B



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_2080

LEGEND

- Modified Development Consent Boundary*
- Mount Pleasant Operation Mining Lease Boundary
- Bengalla Mining Lease Boundary
- Contour (5m Interval)

Primary Domains

- 1 Infrastructure Area
- 2 Fines Emplacement Area
- 3 Water Management Area
- 4 Active Void
- 5 Overburden Emplacement Area

Rehabilitation Phase

- Landform Establishment
- Ecosystem and Land Use Establishment – Initial Rehabilitation
- Ecosystem and Land Use Establishment – Established Rehabilitation

* Appendix 1 of Development Consent DA 92/97

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19
Date

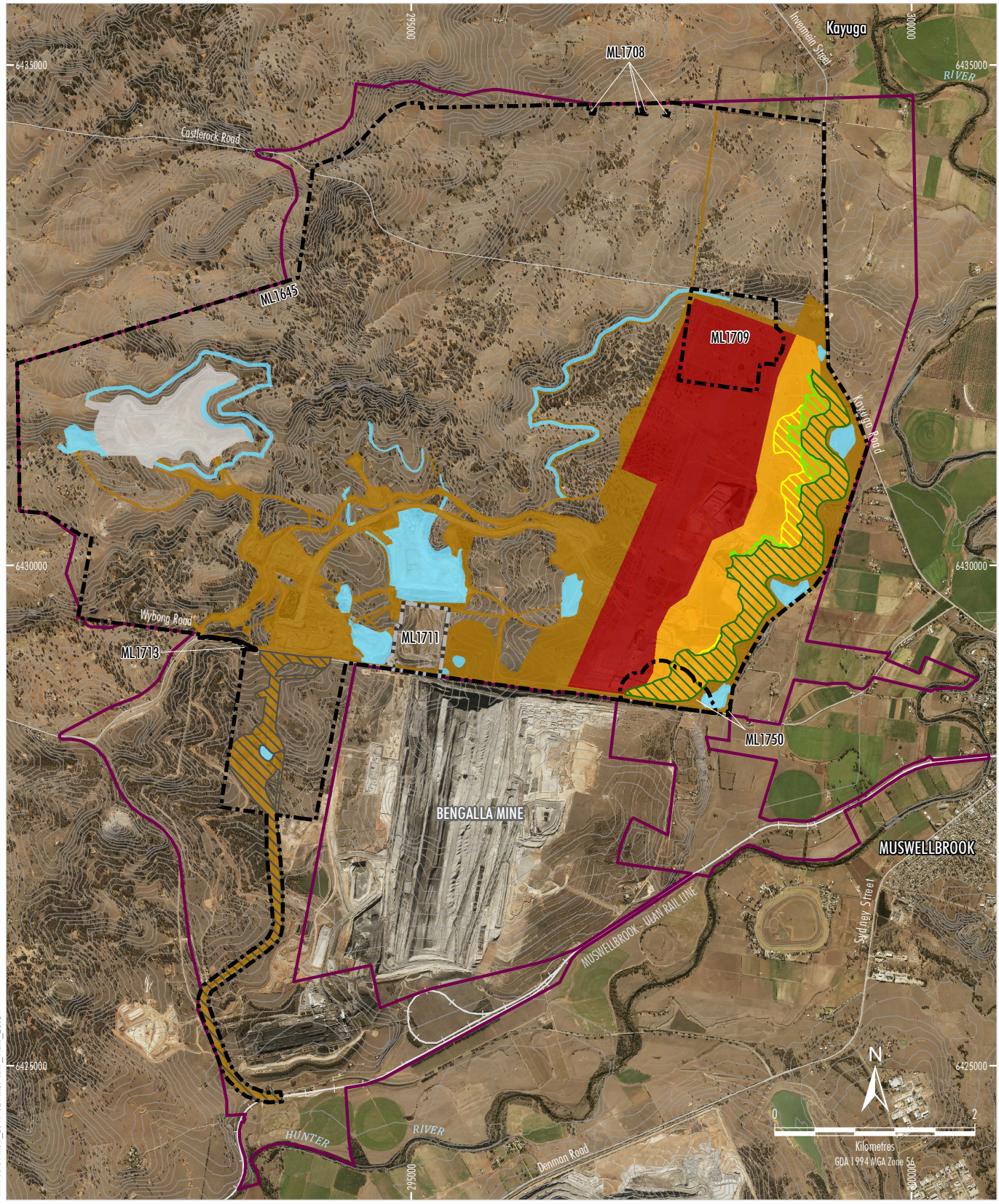
Source: NSW Land & Property Information (2015); NSW Department Resources & Energy (2019); MACH Energy (2019)
Orthophoto: MACH Energy (Jul 2018)

MACHEnergy

MOUNT PLEASANT OPERATION

Mining and Rehabilitation
End of Year 3 of MOP/RMP Term
(30 June 2022)

Plan 3C



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_2090

LEGEND

- Modified Development Consent Boundary*
- Mount Pleasant Operation Mining Lease Boundary
- Bengalla Mining Lease Boundary
- Contour (5m Interval)

Primary Domains

- 1 Infrastructure Area
- 2 Fines Emplacement Area
- 3 Water Management Area
- 4 Active Void
- 5 Overburden Emplacement Area

Rehabilitation Phase

- Decommissioning
- Landform Establishment
- Ecosystem and Land Use Establishment – Initial Rehabilitation
- Ecosystem and Land Use Establishment – Established Rehabilitation

* Appendix 1 of Development Consent DA 92/97

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19
Date

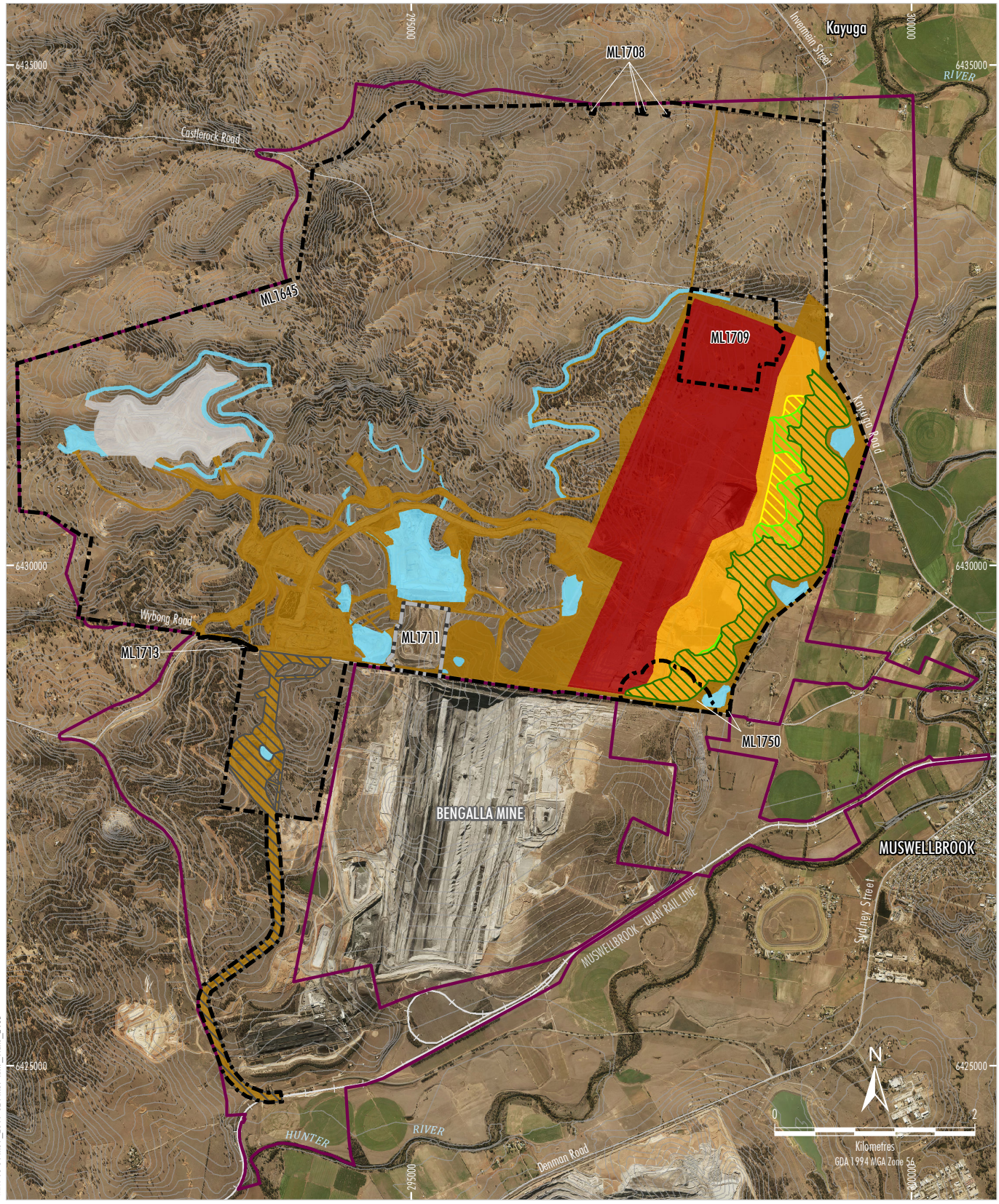
Source: NSW Land & Property Information (2015); NSW Department Resources & Energy (2019); MACH Energy (2019)
Orthophoto: MACH Energy (Jul 2018)

MACHEnergy

MOUNT PLEASANT OPERATION

Mining and Rehabilitation
End of Year 4 of MOP/RMP Term
(30 June 2023)

Plan 3D



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_2100

LEGEND

- Modified Development Consent Boundary*
- Mount Pleasant Operation Mining Lease Boundary
- Bengalla Mining Lease Boundary
- Contour (5m Interval)

Primary Domains

- 1 Infrastructure Area
- 2 Fines Emplacement Area
- 3 Water Management Area
- 4 Active Void
- 5 Overburden Emplacement Area

Rehabilitation Phase

- Decommissioning
- Landform Establishment
- Ecosystem and Land Use Establishment – Initial Rehabilitation
- Ecosystem and Land Use Establishment – Established Rehabilitation

* Appendix 1 of Development Consent DA 92/97

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19
Date

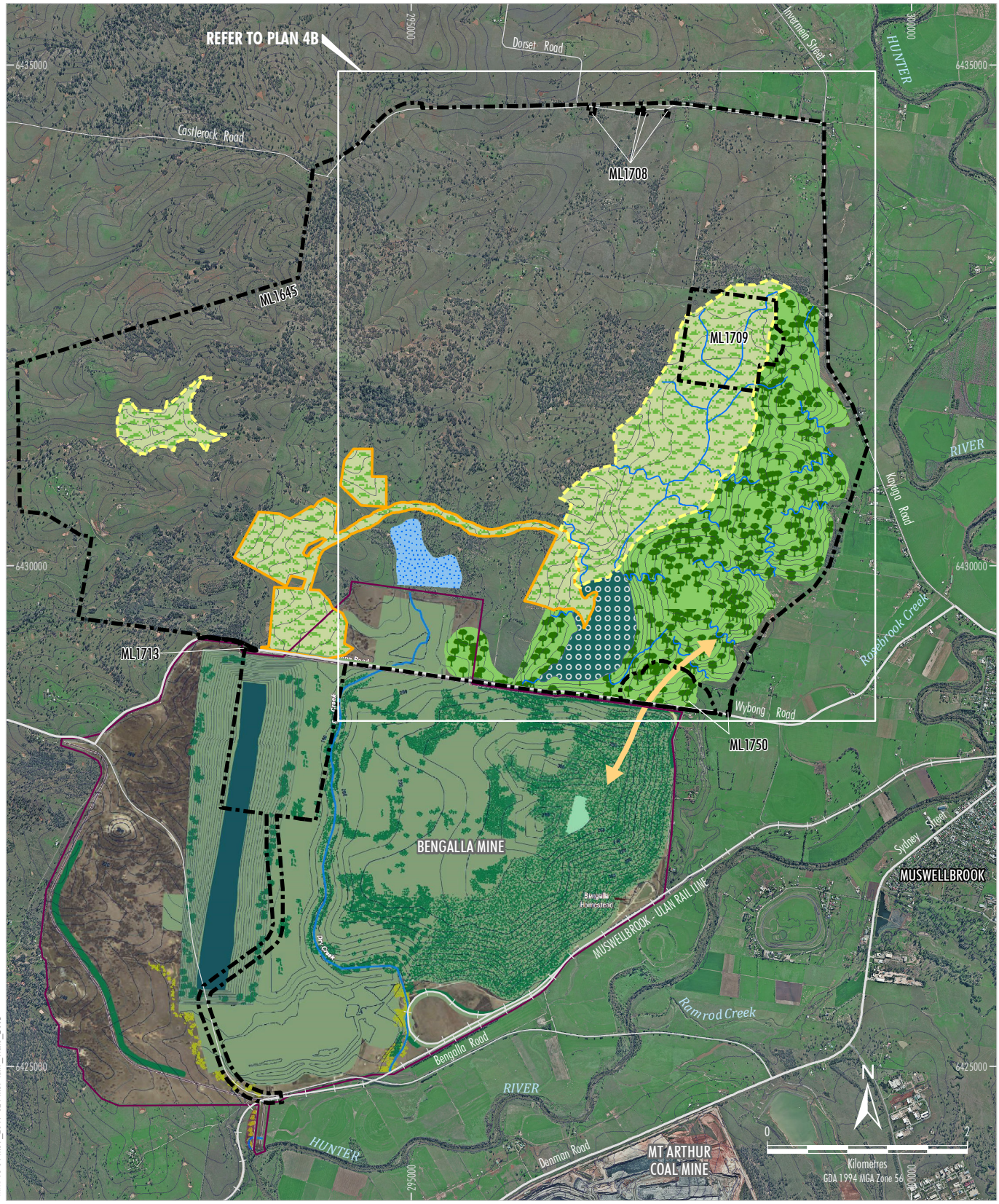
Source: NSW Land & Property Information (2015); NSW Department Resources & Energy (2019); MACH Energy (2019)
Orthophoto: MACH Energy (Jul 2018)

MACHEnergy

MOUNT PLEASANT OPERATION

Mining and Rehabilitation End of Year 5 of MOP/RMP Term (30 June 2024)

Plan 3E



MAC-16-01 MOP_2019-024 MOP-RAP_Plans_211D

LEGEND

Mount Pleasant Mining Lease Boundary

Secondary/Post-mining Land Use Domains

- Domain A - Final Void
- Domain B - Water Infrastructure and Storage
- Domain C - Agricultural Land
- Domain D - Native Woodland/Grassland
- Potential Low Intensity Agriculture Area
- Potential High Intensity Agriculture Area
- Wildlife Corridor

Note: Light vehicle access roads and upslope diversions associated with minimising the catchment of the final void and fines emplacement area are not shown.

Bengalla Mine Conceptual Final Landform *

Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)

** Digitised from Appendix 9 of Development Consent (SSD-5170) and amended in the Mount Pleasant Operation CHPP area.*

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19
Date

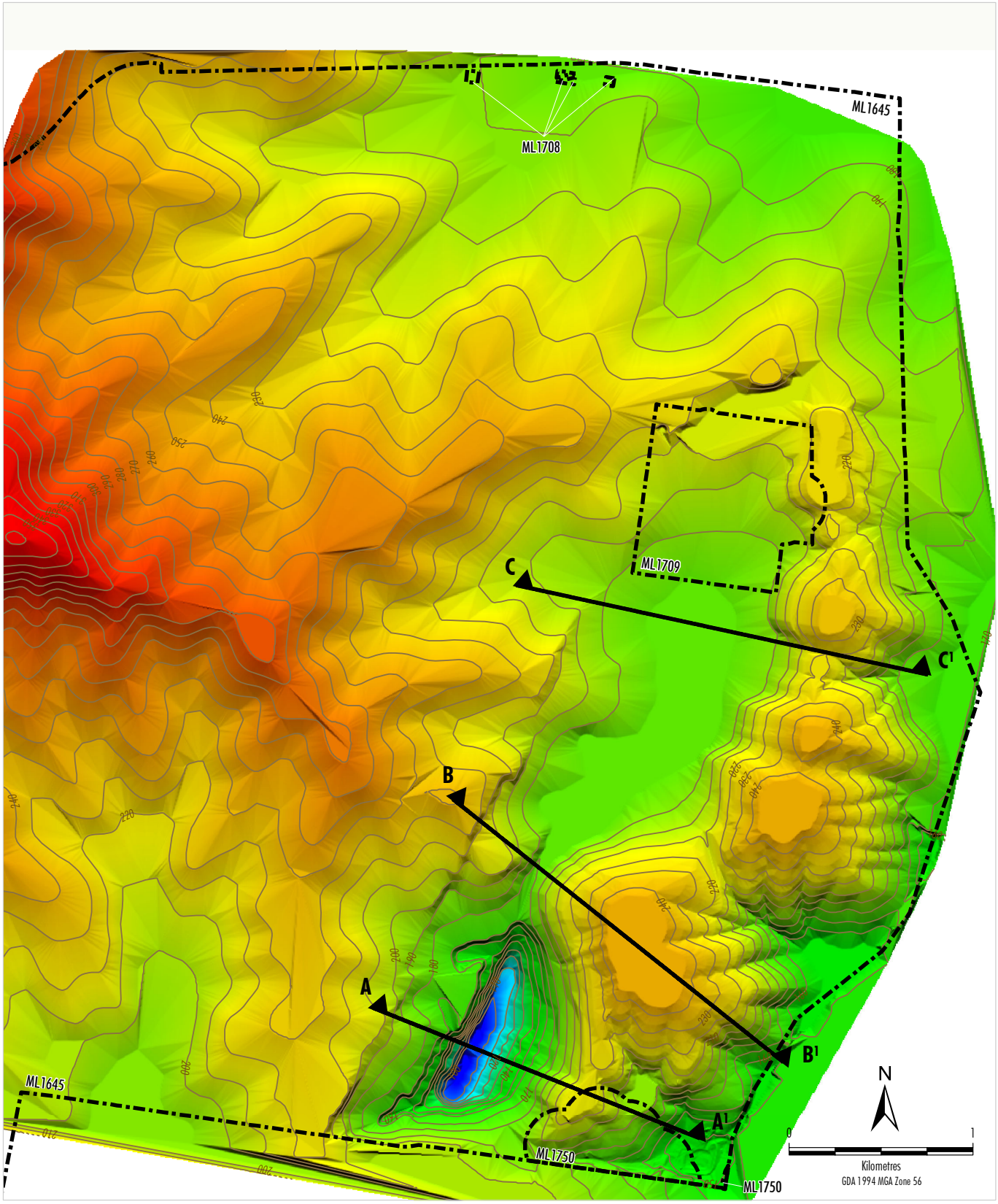
Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2019); Department of Planning and Environment (2016); MACH Energy (2018)
Orthophoto: MACH Energy (Aug 2016)

MACHEnergy

MOUNT PLEASANT OPERATION

Indicative Final Rehabilitation and Post-mining Land Use Domains

Plan 4A



MAC-16-01 MOP_2019-024 MOP-RMP_Plans_212B

LEGEND

Mount Pleasant Mining Lease Boundary

ELEVATION

350 m
300 m
250 m
200 m
150 m
100 m

Source: MACH Energy (2019;) NSW Division of Resources & Energy (2019)

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19

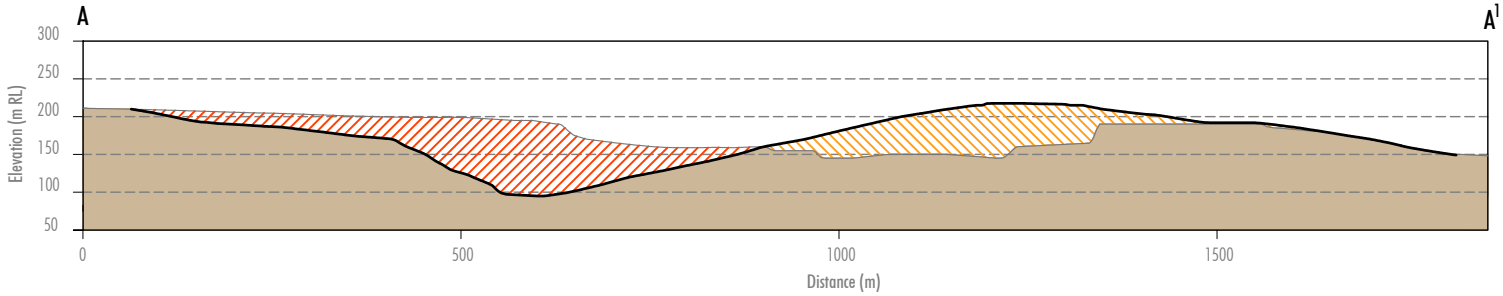
Date

MACHEnergy

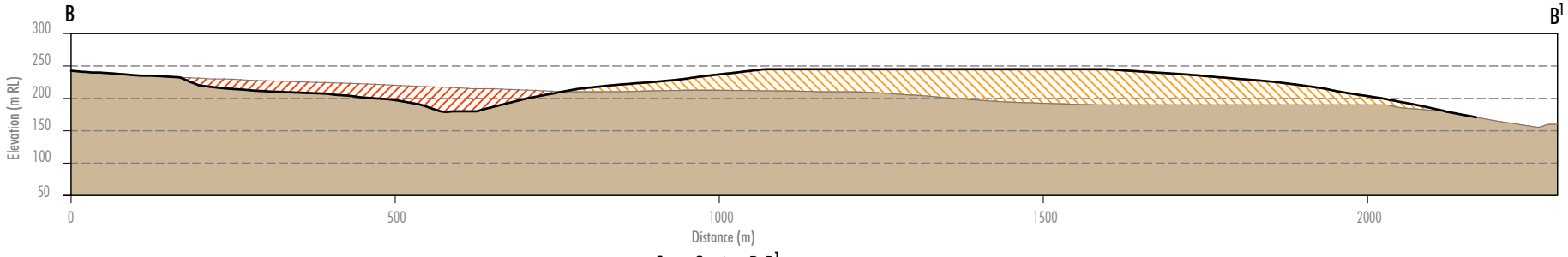
MOUNT PLEASANT OPERATION

Conceptual Final Landform - Plan View

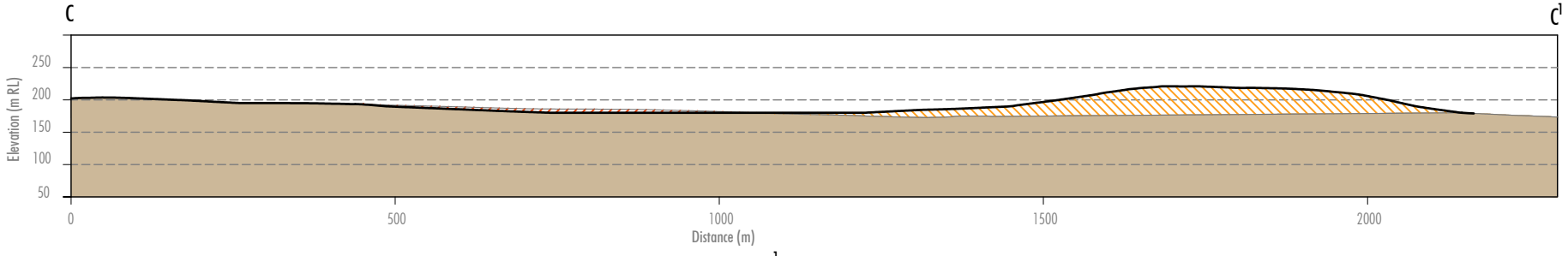
Plan 4B



Cross Section A-A[1]



Cross Section B-B[1]



Cross Section C-C[1]

Not to Scale

MAC 16-01 MOP_2019-024 MOP-RMP_Plans_101A

LEGEND

- Pre-mining Topography
- Proposed Final Landform
- Mined Void
- Overburden Emplacement
- In situ Material

Source: MACH Energy (2019)

I, the representative of MACH Energy Australia Pty Ltd, certify that the information on this plan is a true indication of the proposed development.

Representative

04-06-19

Date

MACHEnergy

MOUNT PLEASANT OPERATION

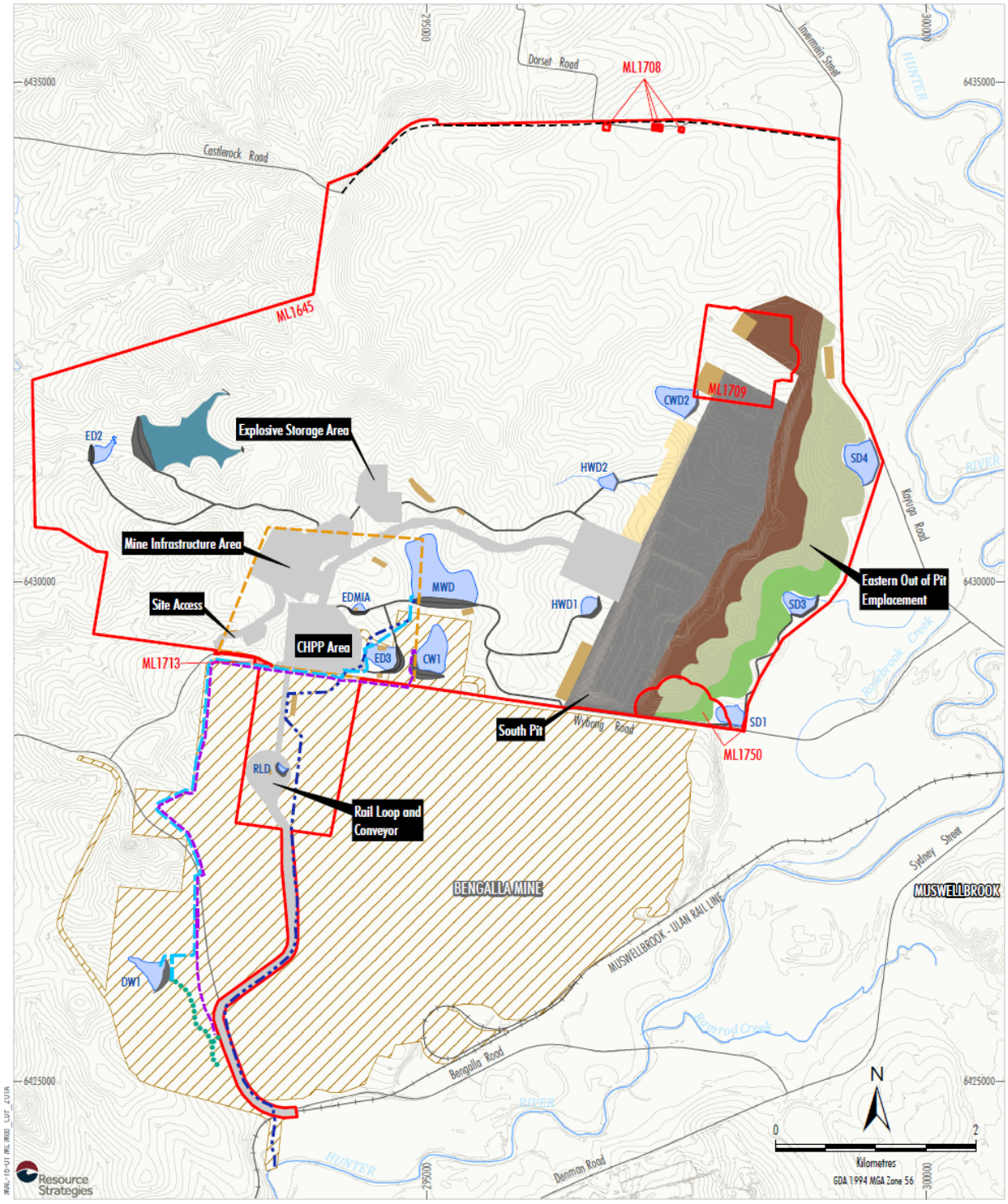
Conceptual Final Landform
- Cross-Sections

Plan 5

ATTACHMENT 1

APPENDIX 2 OF DEVELOPMENT CONSENT DA 92/97

APPENDIX 2
FIGURE 1 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2021



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

MACHEnergy
MOUNT PLEASANT OPERATION

FIGURE 2 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2025

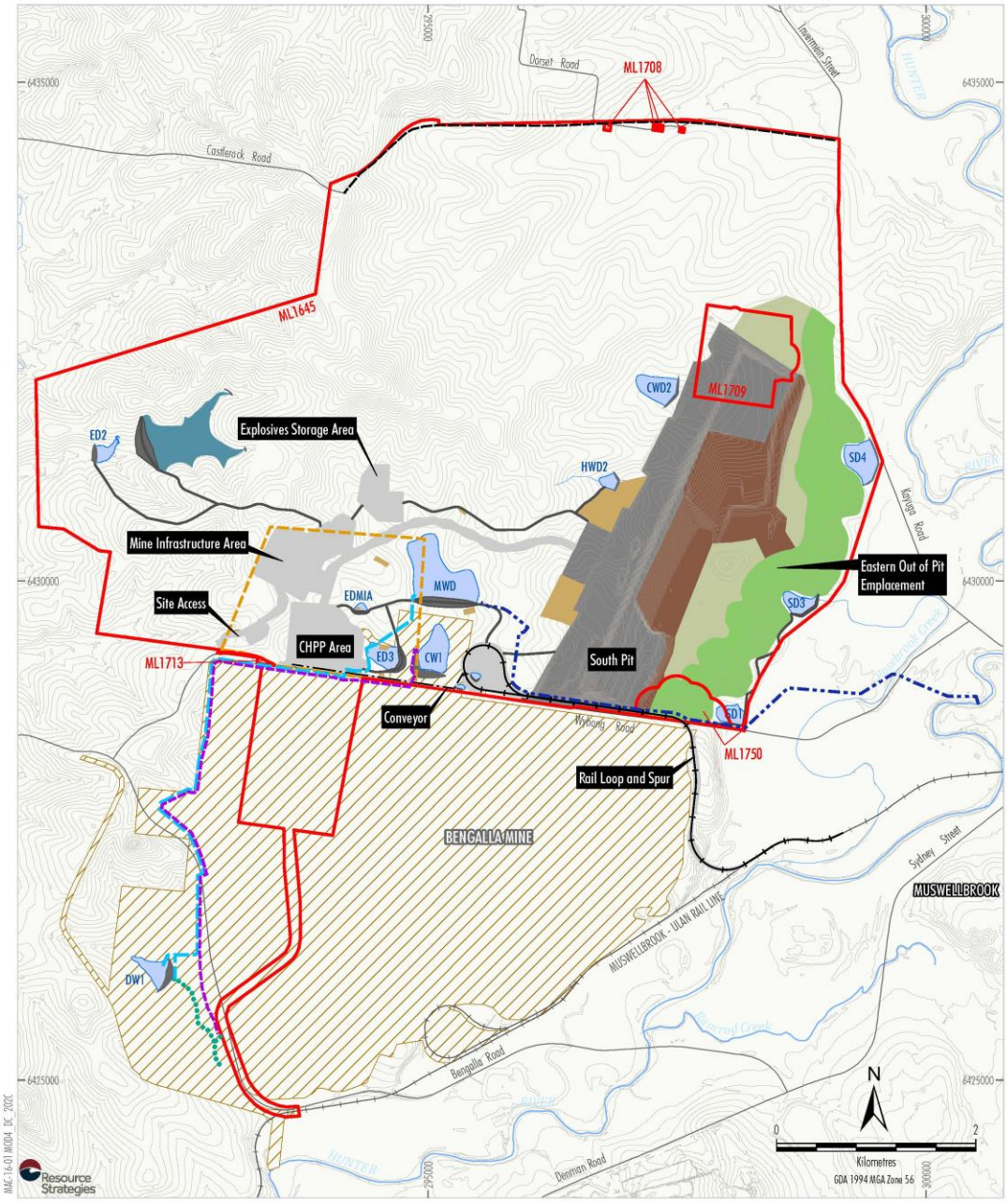
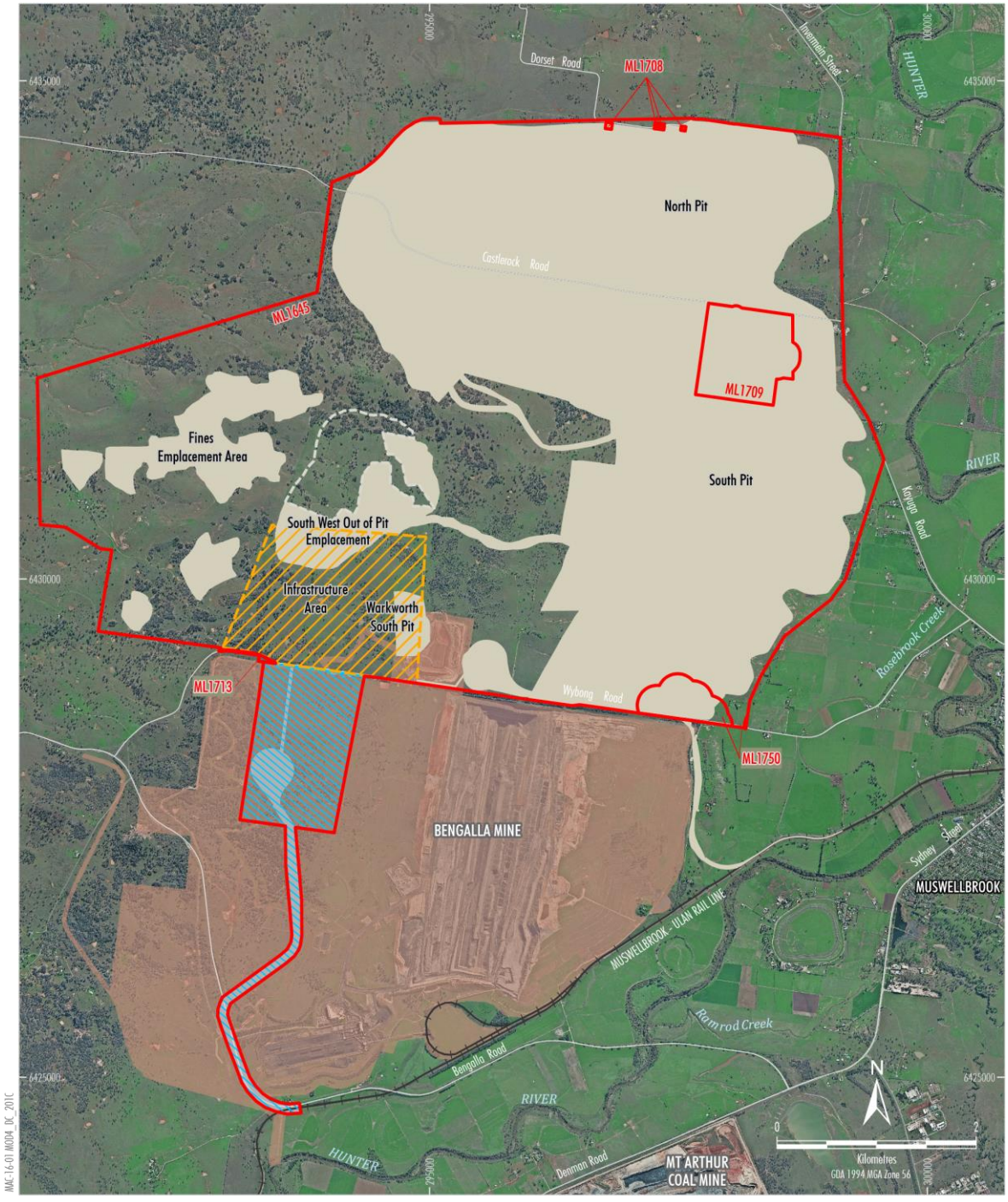


FIGURE 3 - APPROVED SURFACE DISTURBANCE PLAN



LEGEND

- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

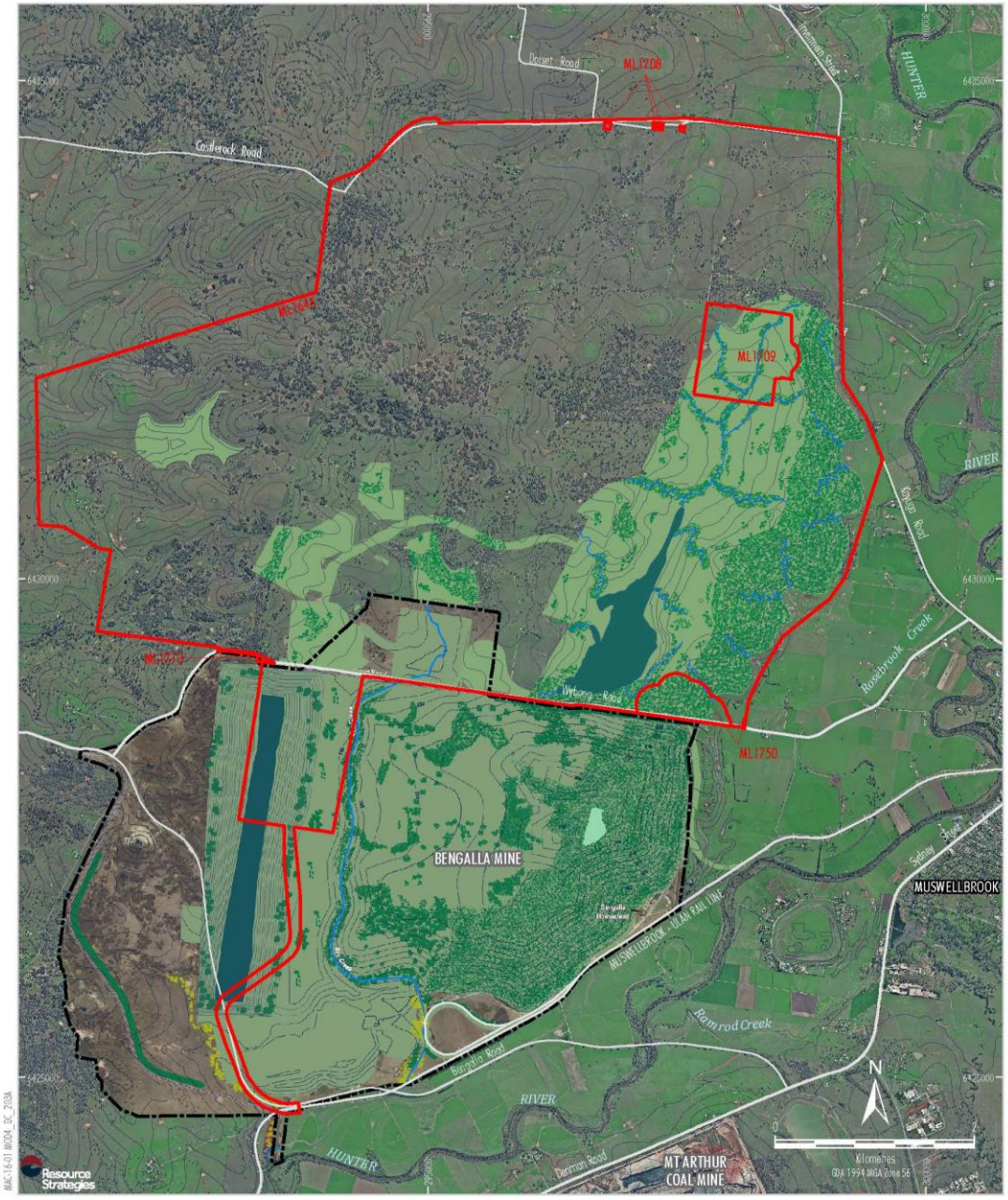
NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

MACHEnergy
MOUNT PLEASANT OPERATION
Approved Surface Disturbance Plan

FIGURE 4 - CONCEPTUAL FINAL LANDFORM



ATTACHMENT 2

RELEVANT MINING LEASES

Department of Industry
Resources & Energy

Transfer Approval Document

Reference: 16/416

TRANSFER OF MINING LEASE 1645 (ACT 1992)

Pursuant to Section 121(1)(a) of the *Mining Act 1992*, the Minister has approved the transfer of this authority from **COAL & ALLIED OPERATIONS PTY LTD** to **MACH ENERGY AUSTRALIA PTY LTD**.

TERMS OF APPROVAL OF TRANSFER OF AUTHORITY:

The terms of this approval take effect upon the registration of this transfer in accordance with Section 122(4) of the Act.

Transferee: MACH Energy Australia Pty Ltd
ACN 608 495 441

Area: The authority embraces an area of **3982 hectares** as shown on the attached plan Catalogue No **M27367**.

Conditions: The conditions in the attached Schedule of Mining Lease Conditions 2013 herein and numbered 1 – 11 (inclusive).

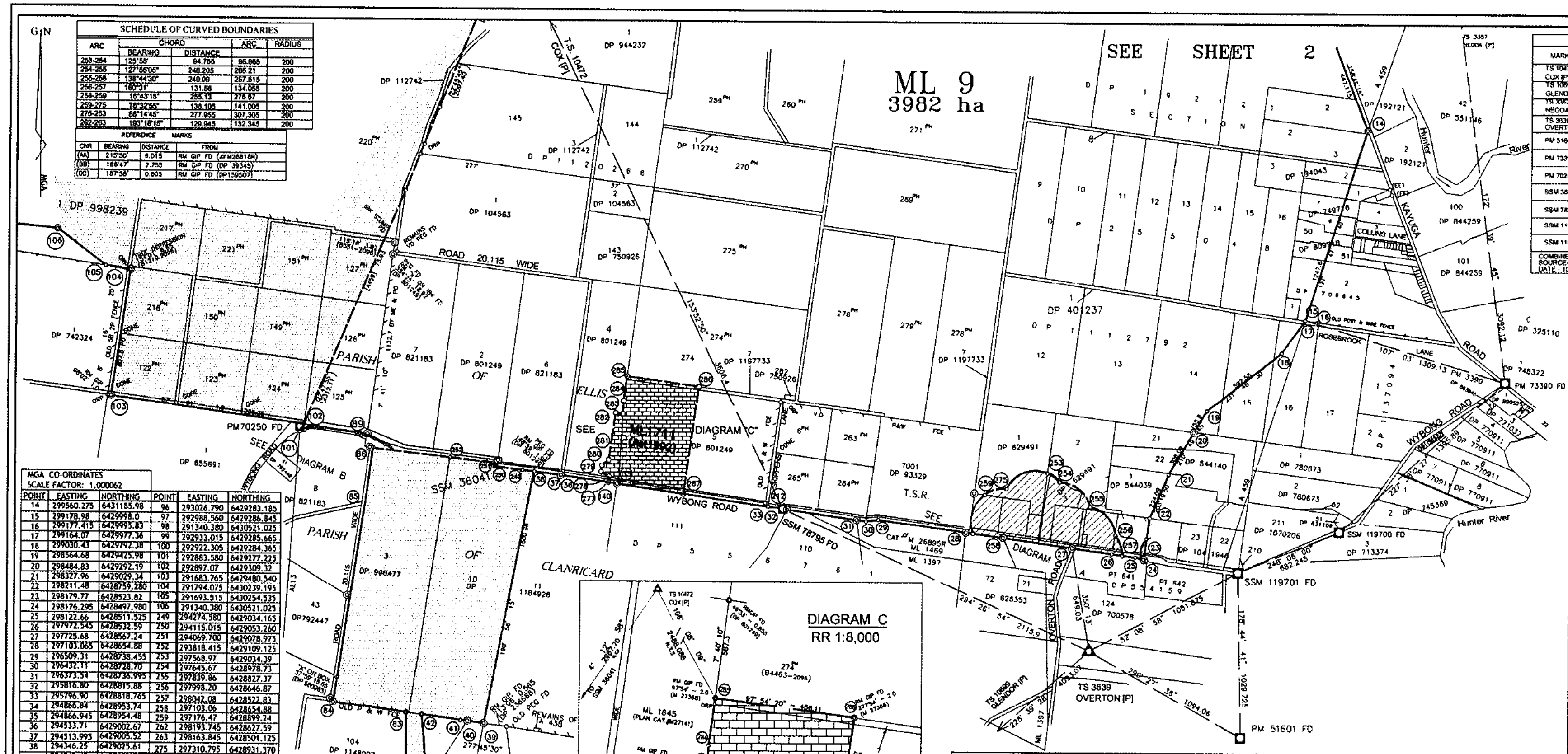
ACCEPTANCE OF TERMS OF APPROVAL:

SIGNED BY

Anthony Roberts MP
Minister for Industry,
Resources and Energy

MACH Energy Australia Pty Ltd
(ACN 608 495 441)

PLAN OF PORTION ML 9



SCHEDULE OF CURVED BOUNDARIES				
ARC	CHORD		ARC	RADIUS
	BEARING	DISTANCE		
253-254	125°58'	94.755	95.665	200
254-255	127°58'05"	248.205	265.21	200
255-256	138°44'30"	240.09	257.615	200
256-257	160°31'	131.56	134.055	200
258-259	16°43'15"	265.13	276.67	200
259-275	76°32'55"	138.105	141.005	200
275-253	88°14'45"	277.955	307.305	200
262-263	193°18'15"	129.945	132.345	200

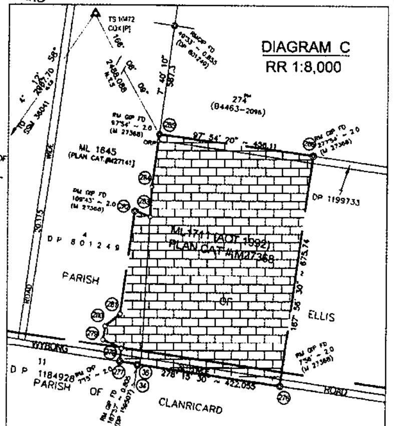
REFERENCE MARKS			
CNR	BEARING	DISTANCE	FROM
(AA)	215°50'	6.015	RM GIP FD (ⅆM26818R)
(BB)	188°47'	7.755	RM GIP FD (DP 39345)
(DD)	187°58'	0.805	RM GIP FD (DP159507)

SURVEYING REGULATIONS 2006 CLAUSE 35(1)(b) and CLAUSE 61(2)							
MARK	MGA CO-ORDINATES		ZONE	CLASS	ORDER	METHOD	ORIGIN
	EASTING	NORTHING					
TS 10472 COX [P]	294321.914	6432041.745	56	B	2	From SCIMS	SCIMS
TS 10699 GLENDOR [P]	294762 788	6426223 784	56	B	2	From SCIMS	SCIMS
TS 3357 NEGOA [P]	300038.979	6432671.200	56	2A	0	From SCIMS	SCIMS
TS 3639 OVERTON [P]	297835.972	6427927.856	56	2A	0	From SCIMS	SCIMS
PM 51601	298788 649	6427389 550	56	B	2	From SCIMS	SCIMS
PM 73390	300430.681	6429614 130	56	C	3	From SCIMS	SCIMS
PM 70250	292873.223	6429295.323	56	C	N/A	RTK GPS	FOUND
SSM 36041	294102 245	6429061 944	56	C	N/A	RTK GPS	FOUND
SSM 78795	295909.678	6428803 415	56	C	N/A	RTK GPS	FOUND
SSM 119700	299399 120	6428073 665	56	C	N/A	RTK GPS	FOUND
SSM 119701	298756.068	6428419 080	56	C	N/A	RTK GPS	FOUND

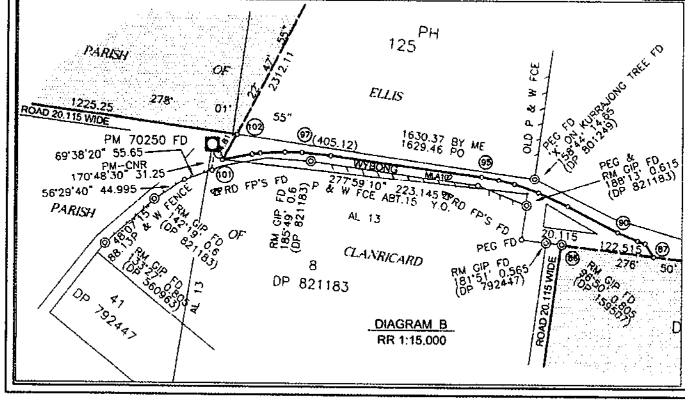
COMBINED SCALE FACTOR 1 00062 (AVERAGE ADOPTED OVERSITE)
SOURCE- MGA COORDINATES TAKEN FROM SCIMS
DATE - 10th JULY 2015

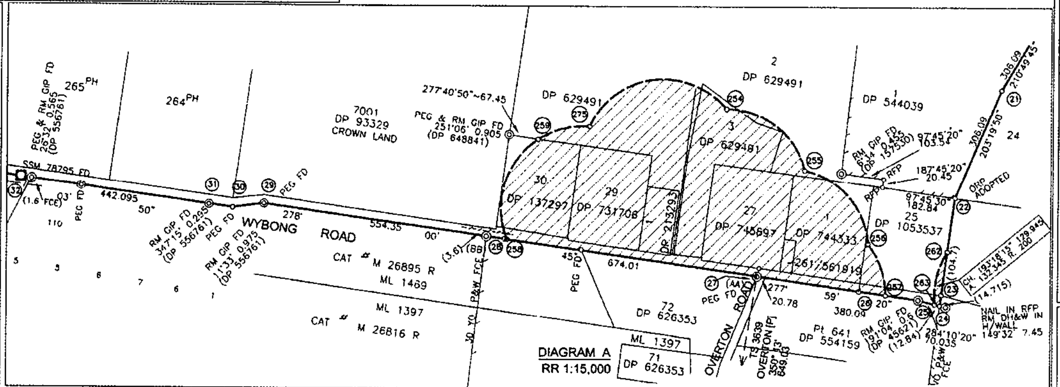
MGA CO-ORDINATES
SCALE FACTOR: 1,000062

POINT	EASTING	NORTHING	POINT	EASTING	NORTHING
14	299560.275	6431185.98	96	293026.790	6429283.185
15	299178.98	6429998.0	97	292988.560	6429286.845
16	299177.415	6429995.83	98	291340.380	6430521.025
17	299164.07	6429977.36	99	292933.015	6429285.665
18	299030.43	6429792.38	100	292922.305	6429284.365
19	298564.68	6429425.98	101	292883.580	6429277.225
20	298484.83	6429292.19	102	292897.07	6429309.32
21	298327.96	6429029.34	103	291683.765	6429480.540
22	298211.48	6428759.280	104	291794.075	6430239.195
23	298179.77	6428523.82	105	291693.515	6430254.535
24	298176.295	6428497.980	106	291340.380	6430521.025
25	298122.66	6428511.525	249	294274.580	6429034.165
26	297972.545	6428532.59	250	294115.015	6429053.260
27	297725.68	6428567.24	251	294069.700	6429078.975
28	297103.065	6428654.88	252	293818.415	6429109.125
29	296509.31	6428738.455	253	297568.97	6429034.39
30	296432.11	6428728.70	254	297645.67	6428978.73
31	296373.54	6428736.995	255	297839.86	6428827.37
32	295816.80	6428815.88	256	297998.20	6428646.87
33	295796.90	6428818.765	257	298042.08	6428522.83
34	294866.84	6428953.74	258	297103.06	6428654.88
35	294866.945	6428954.48	259	297176.47	6428899.24
36	294533.71	6429002.67	262	298193.745	6428627.59
37	294513.995	6429005.52	263	298163.845	6428501.125
38	294346.25	6429025.61	275	297310.795	6428931.370
39	294042.48	6427453.60	276	295284.560	6428893.130
40	293939.27	6427467.66	277	294814.600	6429101.760
41	293893.80	6427473.86	278	294819.230	6428998.250
42	293653.13	6427506.61	279	294765.610	6429025.610
43	293684.97	6427154.77	280	294771.240	6429065.950
82	293556.195	6427131.655	281	294814.620	6428962.070
83	293553.070	6427520.380	282	294856.055	6429398.880
84	293094.835	6427583.555	283	294900.735	6429382.870
85	293284.330	6428805.525	284	294905.585	6429471.160
86	293333.785	6429167.265	285	294926.135	6429625.170
87	293455.435	6429152.670	286	295377.940	6429562.430
88	293444.020	6429169.805			
89	293434.020	6429173.380			
90	293407.640	6429184.165			
91	293341.350	6429217.945			
92	293302.650	6429235.650			
93	293270.735	6429246.865			
94	293249.645	6429252.095			
95	293227.130	6429256.290			



REFERENCE TO BOUNDARIES											
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
15-16	215°50'50"	2.675	84-85	8°48'55"	1236.5	101-102	22°47'55"	34.81	285-286	97°54'20"	456.11
16-17	215°50'50"	22.785	85-86	7°03'50"	365.08	102-103	278°01'55"	1225.25	286-276	187°56'30"	675.74
17-18	215°50'50"	228.19	86-87	96°50'30"	122.515	103-104	8°16'25"	766.585	276-34	278°15'30"	422.055
22-23	187°40'05"	237.565	87-88	326°19'35"	20.59	104-105	276°40'20"	101.715	35-277	278°13'40"	52.875
23-24	187°40'05"	26.075	88-89	289°40'30"	10.620	105-106	307°02'25"	442.38			
29-30	262°47'45"	77.815	89-90	292°14'05"	28.50	38-249	276°49'25"	72.16			
30-31	278°03'50"	59.155	90-91	297°00'15"	74.395	249-250	276°49'25"	160.69			
34-35	7°57'20"	0.745	91-92	294°35'10"	42.555	250-251	299°34'30"	52.10			
35-36	278°13'40"	336.685	92-93	289°21'20"	33.825	251-252	276°50'30"	253.075			
36-37	278°13'40"	19.935	93-94	283°58'25"	21.725	252-86	276°50'30"	488.075			
37-38	276°49'25"	168.96	94-95	280°32'40"	22.905	277-278	7°16'25"	38.47			
39-40	277°45'30"	104.16	95-96	277°38'45"	202.125	278-279	279°01'50"	60.195			
40-41	277°45'30"	45.885	96-97	275°28'15"	38.40	279-280	7°56'30"	40.73			
41-42	277°45'00"	242.875	97-98	271°07'35"	22.75	280-281	60°27'10"	56.235			
42-43	174°49'45"	353.26	98-99	287°09'35"	32.84	281-282	7°56'30"	299.98			
82-83	359°32'20"	388.715	99-100	283°05'05"	10.79	283-284	109°43'	47.46			
83-84	277°51'00"	462.535	100-101	250°33'15"	39.375	284-285	3°08'40"	86.42			





PARISH: ELLIS & CLANRICARD

COUNTY: BRISBANE

MAP SHEET No. 9033-1-S & 9033-2-N

REDUCTION RATIO 1: 20,000

TITLE CODE: ML

TITLE NO: 1645 ACT: 1992

HOLDER:
COAL & ALLIED OPERATIONS PTY LTD

GRANT DATE: 17-12-2010

STATUS:

METHOD: OPEN CUT

SURFACE EXCEPTION / DEPTH RESTRICTION

- Embraces the strata between a depth of 15 metres below the surface to a depth of 900 metres below Australian Height Datum (AHD).
- Embraces the surface and soil below thereof to a depth of 40 metres.
- Embraces the surface and soil below thereof to a depth of 900 metres below AHD.
- Embraces the strata between a depth of 15 metres below the surface to a depth of 40 metres below the surface.
- Embraces the strata between a depth of 40 metres below the surface to a depth of 900 metres below AHD

NOTES:

LEASE PART TRANSFERRED TO ML 1711

THIS PLAN SUPERSEDES: M27095

Azimuth: TS 10472 COX[P] - TS 3357 NEGOA [P]

Plans used in the course of this survey/compilation
"SEE TABLE HEREIN"

Survey declared on this plan for lines
THE WHOLE

SHEET 3 OF 3

I ROSS ANDREW PEASLEY

of MUSWELLBROOK NSW 2333

a Surveyor Registered under the Surveying and Spatial Information Act 2002, hereby certify that the survey /compilation represented in this plan is accurate and has been completed in accordance with the Surveying and Spatial Information Regulation 2012 and the Surveyor General's Direction for Mining Surveys and was completed on 10TH JULY 2015

Signature : Ross Peasley

BOSSI Identification No : 162

FORM10

Survey Calcs : ....

Plan Investigated : 13-08-2015

Plan Approved : 13-08-2015

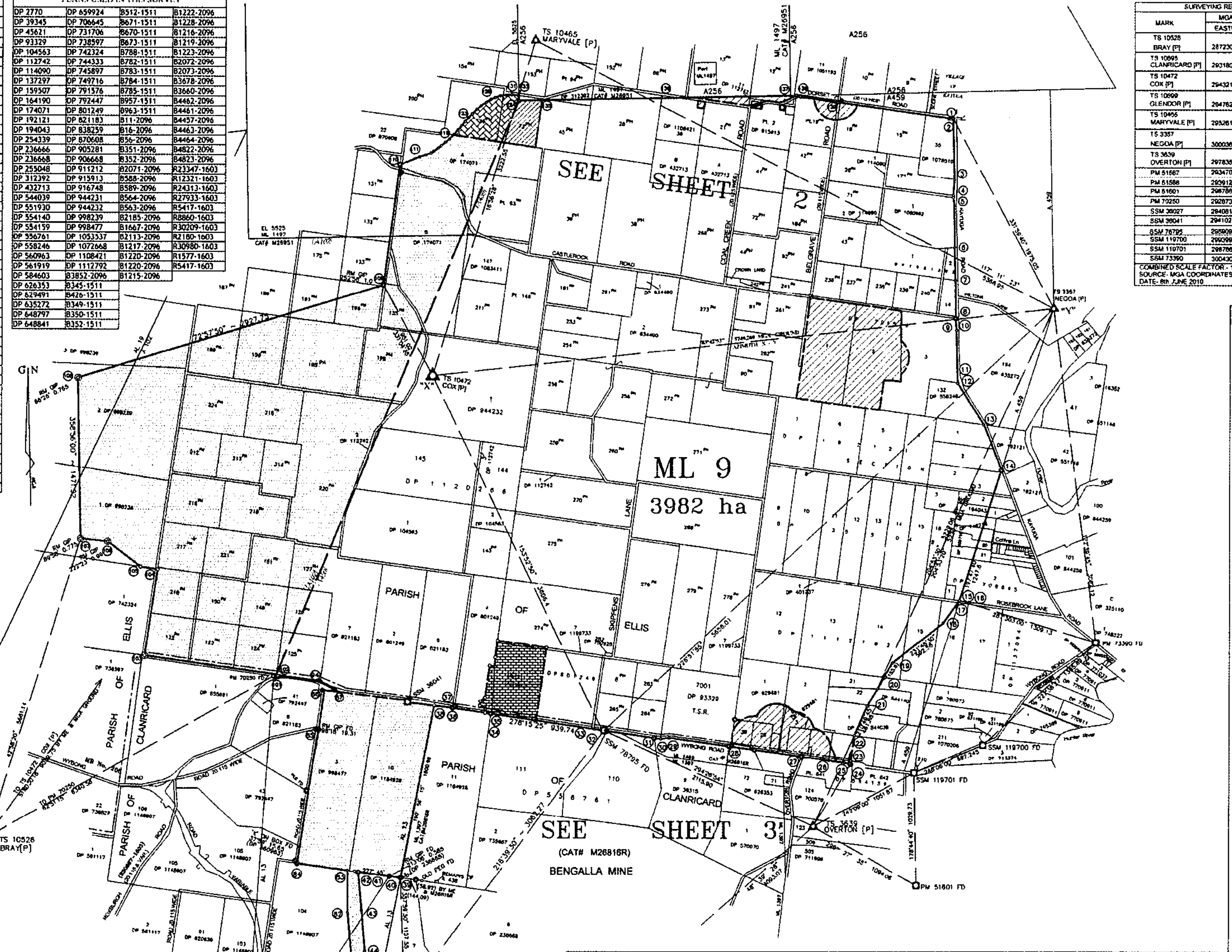
Paper No : 15/1026

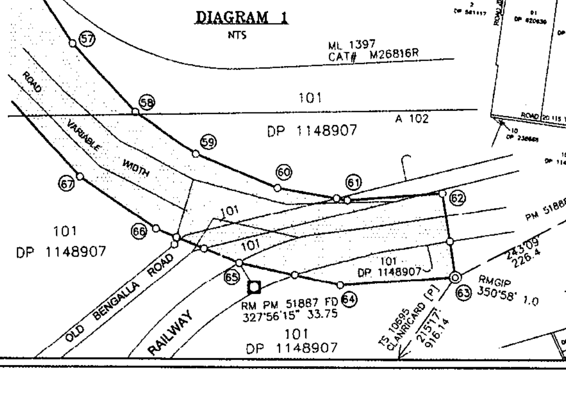
R 17009200
D 110097230

M27367

SCHEDULE OF MGA CO-ORDINATES SCALE FACTOR: 1.000062 ZONE:- 56 [VIDE #M27095]					
POINT	EASTING	NORTHING	POINT	EASTING	NORTHING
1	299109.53	6434415.09	91	293341.350	6429217.945
2	299110.40	6434394.95	92	293302.650	6429235.650
3	299121.505	6433857.085	93	293270.735	6429246.865
4	299115.355	6433709.13	94	293249.645	6429252.095
5	299115.83	6433688.77	95	293227.130	6429256.290
6	299126.46	6433230.105	96	293026.790	6429283.185
7	299134.18	6432931.345	97	292988.560	6429286.845
8	299136.44	6432598.705	98	292965.815	6429287.290
9	299136.675	6432578.305	99	292933.015	6429285.665
10	299144.295	6432469.59	100	292922.305	6429284.365
11	299156.715	6431987.475	101	292883.580	6429277.225
12	299156.765	6431985.485	102	292897.07	6429309.32
13	299398.725	6431602.92	103	291683.765	6429480.540
14	299560.275	6431185.98	104	291794.075	6430239.195
15	299178.98	6429998.0	105	291693.515	6430254.535
16	299177.415	6429995.83	106	291340.380	6430521.025
17	299164.07	6429977.36	107	291089.850	6430544.635
18	299030.43	6429792.38	108	291062.430	6432016.390
19	298564.68	6429425.98	109	293861.895	6432874.170
20	298484.83	6429292.19	110	294014.110	6433981.270
21	298327.96	6429029.34	111	294194.935	6434054.00
22	298211.48	6428759.280	112	294250.485	6434072.040
23	298179.77	6428523.82	113	294299.450	6434087.940
24	298176.295	6428497.980	114	294325.650	6434106.125
25	298122.66	6428511.525	115	294366.965	6434134.795
26	297972.545	6428532.59	116	294395.575	6434157.095
27	297725.68	6428567.24	117	294435.31	6434188.07
28	297103.065	6428654.88	118	294466.76	6434216.64
29	296509.31	6428738.455	119	294514.52	6434262.55
30	296432.11	6428728.70	120	294580.075	6434338.175
31	296373.54	6428736.995	121	294613.14	6434376.80
32	295816.80	6428815.88	122	294645.475	6434414.57
33	295796.90	6428818.765	123	294679.64	6434450.03
34	294866.84	6428953.74	124	294723.435	6434493.86
35	294866.945	6428954.48	125	294760.685	6434526.10
36	294533.71	6429002.67	126	294810.08	6434557.44
37	294513.995	6429005.52	127	294851.465	6434583.70
38	294346.25	6429025.61	128	294890.485	6434598.715
39	294042.48	6427453.60	129	294935.865	6434616.185
40	293939.27	6427467.66	130	294992.135	6434621.405
41	293893.80	6427473.86	131	295040.795	6434625.925
42	293653.13	6427506.61	132	295103.435	6434617.475
43	293684.97	6427154.77	133	295107.405	6434616.940
44	293716.51	6426779.95	134	295108.295	6434573.400
45	293718.185	6426427.145	135	295322.525	6434577.695
46	293704.03	6426328.14	136	296419.010	6434599.690
47	293684.85	6426275.32	137	297606.22	6434623.52
48	293644.675	6426216.75	138	297698.94	6434613.75
49	293560.785	6426144.665	139	298042.48	6434565.83
50	293000.975	6425740.110			
51	292974.795	6425668.27			
52	292973.085	6425625.57			
53	292991.97	6425563.795			
54	293070.140	6425342.955			
55	293123.21	6425192.16			
56	293194.99	6425001.32			
57	293252.365	6424915.53			
58	293327.510	6424834.345			
59	293400.095	6424785.33			
60	293497.830	6424745.585			
61	293581.145	6424731.505			
62	293694.375	6424739.75			
63	293710.09	6424640.97			
64	293572.92	6424631.46			
65	293452.47	6424657.205			
66	293352.765	6424696.610			
67	293261.955	6424757.925			
68	293172.440	6424854.645			
69	293114.470	6424948.080			
70	293036.230	6425157.465			
71	292976.485	6425307.785			
72	292896.960	6425532.470			
73	292872.465	6425612.585			
74	292875.385	6425685.485			
75	292894.205	6425745.700			
76	292921.990	6425804.600			
77	293499.445	6426223.735			
78	293569.255	6426283.620			
79	293608.295	6426357.530			
80	293618.120	6426428.845			
81	293596.665	6426693.570			
82	293556.195	6427131.655			
83	293553.070	6427520.380			
84	293094.835	6427583.555			
85	293284.330	6428805.525			
86	293333.785	6429167.265			
87	293455.435	6429152.670			
88	293444.020	6429169.805			
89	293434.020	6429173.380			
90	293407.640	6429184.165			

PLANS USED IN THIS SURVEY			
DP 2770	DP 659924	B512-1511	B1222-2096
DP 39345	DP 706645	B671-1511	B1228-2096
DP 45621	DP 731706	B670-1511	B1216-2096
DP 93329	DP 738597	B673-1511	B1219-2096
DP 104563	DP 742324	B788-1511	B1223-2096
DP 112742	DP 744333	B782-1511	B2072-2096
DP 114090	DP 745897	B783-1511	B2073-2096
DP 137297	DP 749716	B784-1511	B3678-2096
DP 159507	DP 791576	B785-1511	B3660-2096
DP 164190	DP 792447	B957-1511	B4462-2096
DP 174071	DP 801249	B963-1511	B4461-2096
DP 192121	DP 821183	B11-2096	B4457-2096
DP 194043	DP 838259	B16-2096	B4463-2096
DP 254339	DP 870608	B56-2096	B4464-2096
DP 236666	DP 905281	B351-2096	B4822-2096
DP 236668	DP 906668	B352-2096	B4823-2096
DP 255048	DP 911212	B2071-2096	R23347-1603
DP 312392	DP 915913	B588-2096	R12321-1603
DP 432713	DP 916748	B589-2096	R24313-1603
DP 544039	DP 944231	B564-2096	R27933-1603
DP 551930	DP 944232	B563-2096	R5417-1603
DP 554140	DP 998239	B2185-2096	R8860-1603
DP 554159	DP 998477	B1667-2096	R30209-1603
DP 556761	DP 1053537	B2113-2096	R2180-1603
DP 558246	DP 1072668	B1217-2096	R30980-1603
DP 560963	DP 1108421	B1220-2096	R1577-1603
DP 561919	DP 1112792	B1220-2096	R5417-1603
DP 584603	B3852-2096	B1215-2096	
DP 626353	B345-1511		
DP 629491	B426-1511		
DP 635272	B349-1511		
DP 648797	B350-1511		
DP 648841	B352-1511		





SURVEYING REGULATIONS 2006 CLAUSE 35(1)(b) and CLAUSE 61(2)							
MARK	MGA CO-ORDINATES		ZONE	CLASS	ORDER	METHOD	ORIGIN
	EASTING	NORTHING					
TS 10526 BRAY [P]	287230.730	6426402.173	56	B	2	FROM SCIMS	SCIMS
TS 10695 CLANRICARD [P]	293180.866	6423893.081	56	B	2	FROM SCIMS	SCIMS
TS 10472 COX [P]	294321.914	6432041.746	56	B	2	FROM SCIMS	SCIMS
TS 10699 GLENDOR [P]	294762.788	6425223.784	56	B	2	FROM SCIMS	SCIMS
TS 10465 MARYVALE [P]	295261.003	6435124.627	56	B	2	FROM SCIMS	SCIMS
TS 3357 NEGOA [P]	300036.979	6432671.208	56	2A	0	FROM SCIMS	SCIMS
TS 3639 OVERTON [P]	297835.972	6427927.650	56	2A	0	FROM SCIMS	SCIMS
PM 51567	293470.386	6424628.802	56	B	2	FROM SCIMS	SCIMS
PM 51588	290912.104	6424743.222	56	B	2	FROM SCIMS	SCIMS
PM 51601	298786.649	6427389.558	56	B	2	FROM SCIMS	SCIMS
PM 70250	292873.223	6429295.323	56	C	N/A	RTK GPS	FOUND
SSM 36027	294081.284	6426348.662	56	C	N/A	RTK GPS	FOUND
SSM 36041	294102.245	6429061.944	56	C	N/A	RTK GPS	FOUND
SSM 78795	295909.678	6428803.415	56	C	N/A	RTK GPS	FOUND
SSM 119700	299099.120	6428673.565	56	C	N/A	RTK GPS	FOUND
SSM 119701	298786.068	6428419.060	56	C	N/A	RTK GPS	FOUND
SSM 73390	300430.681	6429814.130	56	C	3	FROM SCIMS	SCIMS

COMBINED SCALE FACTOR - 1.000062
SOURCE- MGA COORDINATES TAKEN FROM SCIMS
DATE- 8th JUNE 2010

PLAN OF PORTION ML 9

PARISH: ELLIS & CLANRICARD

COUNTY: BRISBANE

MAP SHEET No. 9033-1-S & 9033-2-N

REDUCTION RATIO 1: 20,000

TITLE CODE: ML

TITLE NO: 1645 ACT: 1992

HOLDER:
COAL & ALLIED OPERATIONS PTY LTD

GRANT DATE: 17-12-2010

STATUS:

METHOD: OPEN CUT

SURFACE EXCEPTION / DEPTH RESTRICTION

- Embraces the strata between a depth of 15 metres below the surface to a depth of 900 metres below Australian Height Datum (AHD).
- Embraces the surface and soil below thereof to a depth of 40 metres
- Embraces the surface and soil below thereof to a depth of 900 metres below AHD.
- Embraces the strata between a depth of 15 metres below the surface to a depth of 40 metres below the surface.
- Embraces the strata between a depth of 40 metres below the surface to a depth of 900 metres below AHD

NOTES:

LEASE PART TRANSFERRED TO ML 1711

THIS PLAN SUPERSEDES: M27095

Azimuth: TS 10472 COX[P] - TS 3357 NEGOA [P]

Plans used in the course of this survey/compilation
"SEE TABLE HEREIN"

Survey declared on this plan for lines
THE WHOLE

SHEET 1 OF 3

REFERENCE TO BOUNDARIES														
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
1–2	177°33'00"	20.155	32–33	278°15'25"	20.11	63–64	266°01'55"	137.49	92–93	289°21'20"	33.825	121–122	40°33'55"	49.715
2–3	178°49'00"	537.95	34–35	7°57'20"	0.745	64–65	282°03'55"	123.16	93–94	283°56'25"	21.725	122–123	43°56'00"	49.245
3–4	182°22'50"	148.075	35–36	278°13'40"	336.68	65–66	291°33'50"	107.205	94–95	280°32'40"	22.905	123–124	44°58'30"	61.955
4–5	178°40'00"	20.365	36–37	278°13'40"	19.925	66–67	304°01'45"	109.565	95–96	277°38'45"	202.125	124–125	49°07'40"	49.265
5–6	178°40'20"	458.76	37–38	276°49'25"	168.945	67–68	317°12'50"	131.775	96–97	275°28'15"	36.40	125–126	57°36'15"	58.495
6–7	178°31'10"	298.84	39–40	277°45'30"	104.18	68–69	328°11'00"	109.950	97–98	271°07'35"	22.75	126–127	57°36'15"	49.015
7–8	179°36'40"	332.625	40–41	277°45'30"	45.885	69–70	339°30'40"	223.515	98–99	267°09'35"	32.84	127–128	66°57'05"	41.805
8–9	179°20'00"	20.40	41–42	277°45'00"	242.875	70–71	338°19'30"	161.745	99–100	263°05'05"	10.79	128–129	68°57'00"	48.625
9–10	175°59'25"	108.975	42–43	174°49'45"	353.26	71–72	340°30'35"	238.330	100–101	259°33'15"	39.375	129–130	84°41'50"	58.51
10–11	178°31'25"	482.245	43–44	175°11'25"	376.12	72–73	342°59'50"	83.770	101–102	22°47'55"	34.81	130–131	84°41'50"	48.865
11–12	178°31'25"	1.99	44–45	179°43'40"	352.785	73–74	2°17'45"	72.955	102–103	278°01'55"	1225.25	131–132	97°40'50"	63.20
12–13	147°41'15"	452.63	45–46	188°08'15"	100.005	74–75	17°21'10"	63.080	103–104	8°16'25"	766.585	132–133	97°40'50"	4.005
13–14	158°49'15"	447.11	46–47	199°57'15"	56.19	75–76	25°15'15"	65.125	104–105	278°40'20"	101.715	133–134	179°49'50"	43.545
15–16	215°50'50"	2.675	47–48	214°26'55"	71.025	76–77	54°01'35"	713.490	105–106	307°02'25"	442.38	134–135	88°51'05"	214.26
16–17	215°50'50"	22.785	48–49	229°19'40"	110.60	77–78	49°22'40"	91.970	106–107	275°23'00"	251.625	135–136	88°51'05"	1096.64
17–18	215°50'50"	228.19	49–50	234°08'50"	690.64	78–79	27°50'30"	83.580	107–108	358°58'00"	1471.92	136–137	88°51'05"	1187.37
19–20	210°49'45"	155.8	50–51	200°01'15"	76.460	79–80	7°50'40"	71.985	108–109	72°57'50"	2927.75	137–138	95°59'55"	93.235
20–21	210°49'45"	306.09	51–52	182°17'45"	42.73	80–81	355°22'00"	265.575	109–110	7°49'45"	1117.44	138–139	97°56'30"	346.845
21–22	203°19'50"	294.09	52–53	162°59'50"	64.59	81–82	354°43'20"	439.920	110–111	68°05'25"	194.89	139–1	98°02'25"	1077.58
22–23	187°40'05"	237.565	53–54	160°30'20"	234.25	82–83	359°32'20"	388.715	111–112	72°00'20"	58.40			
23–24	187°40'05"	26.07	54–55	160°36'40"	159.845	83–84	277°51'00"	462.535	112–113	72°00'20"	51.48			
24–25	284°10'20"	55.315	55–56	159°23'10"	203.885	84–85	8°48'55"	1236.5	113–114	55°14'35"	31.89			
25–26	277°59'20"	151.575	56–57	146°13'35"	103.20	85–86	7°47'05"	385.08	114–115	55°14'35"	50.285			
26–27	277°59'20"	249.27	57–58	137°12'50"	110.815	86–87	96°50'30"	122.515	115–116	52°03'45"	36.27			
27–28	278°00'45"	673.97	58–59	124°01'45"	87.580	87–88	326°19'35"	20.59	116–117	52°03'50"	50.38			
28–29	278°00'45"	554.315	59–60	112°07'50"	105.500	88–89	289°40'30"	10.620	117–118	47°44'45"	42.485			
29–30	262°47'45"	77.815	60–61	99°35'30"	84.495	89–90	292°14'05"	28.50	118–119	46°07'50"	66.25			
30–31	278°03'50"	59.155	61–62	85°50'10"	113.52	90–91	297°00'15"	74.395	119–120	40°55'10"	100.075			
31–32	278°03'50"	562.27	62–63	170°57'40"	100.01	91–92	294°35'10"	42.555	120–121	40°34'05"	50.845			

NOTE: (1) ALL DISTANCES SHOWN HEREIN ARE GROUND DISTANCES
(2) GPS OBSERVATIONS HAVE BEEN USED FOR PART OF THE SURVEY SHOWN HEREON

I ROSS ANDREW PEASLEY

of MUSWELLBROOK NSW 2333

a Surveyor Registered under the Surveying and Spatial Information Act 2002, hereby certify that the survey /compilation represented in this plan is accurate and has been completed in accordance with the Surveying and Spatial Information Regulation 2012 and the Surveyor General's Direction for Mining Surveys and was completed on 10TH JULY 2015

Signature : ....

BOSSI Identification No : 162

FORM 10

Survey Calcs : ....

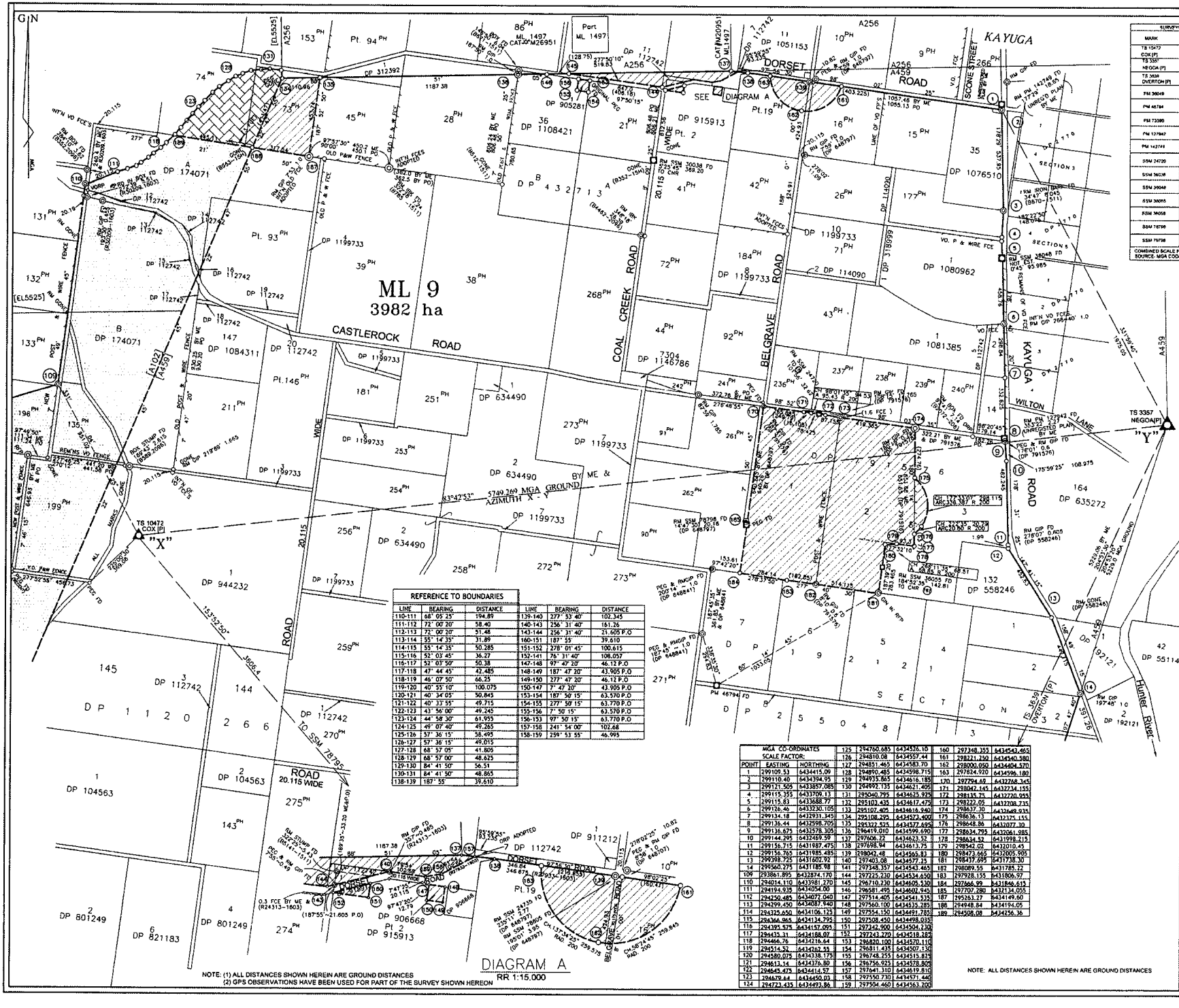
Plan Investigated : 13-08-2015

Plan Approved : 13-08-2015

Paper No : 15/1026

R 17009200
D 110097210

M27367



SURVEYING & SPATIAL INFORMATION REGULATION 2012 CLAUSE 35(1)(b) and CLAUSE 61(2)							
MARK	MGA CO-ORDINATES EASTING	NORTHING	ZONE	CLASS	ORDER	METHOD	ORIGIN
TS 10472 COX (P)	294321.814	6432041.745	56	B	2	FROM SCIMS	SCIMS
TS 3357 NEGOA (P)	300038.978	6435871.208	56	2A	0	FROM SCIMS	SCIMS
TS 3638 OVERTON (P)	297816.972	6427927.650	56	2A	0	FROM SCIMS	SCIMS
PM 36049	297926.670	6433628.756	56	C	N/A	RTK GPS	FOUND
PM 46784	297540.78	6431225.68	56	C	N/A	RTK GPS	FOUND
PM 73380	300410.681	6429614.136	56	C	3	FROM SCIMS	SCIMS
PM 127942	297835.972	6427927.650	56	2A	0	FROM SCIMS	SCIMS
PM 142749	297835.972	6427927.650	56	2A	0	FROM SCIMS	FOUND
SSM 24720	298103.84	6430727.70	56	C	N/A	RTK GPS	FOUND
SSM 36038	297157.55	6434147.12	56	2A	0	FROM SCIMS	SCIMS
SSM 39048	297835.972	6427927.650	56	C	N/A	RTK GPS	FOUND
SSM 36055	298442.934	6431880.803	56	C	N/A	RTK GPS	FOUND
SSM 36058	298449.934	6431880.803	56	C	N/A	RTK GPS	FOUND
SSM 78796	297898.878	6428803.415	56	C	N/A	RTK GPS	FOUND
SSM 79798	297733.13	6432114.51	56	C	N/A	RTK GPS	FOUND

COMBINED SCALE FACTOR = 1.000042
SOURCE: MGA COORDINATES TAKEN FROM SCIMS DATE: 10th JULY 2015

PLAN OF PORTION ML 9

PARISH: ELLIS & CLANRICARD

COUNTY: BRISBANE

MAP SHEET No. 9033-1-S & 9033-2-N

REDUCTION RATIO 1: 10,000

TITLE CODE: ML

TITLE NO: 1645 ACT: 1992

HOLDER:
COAL & ALLIED OPERATIONS PTY LTD

GRANT DATE: 17-12-2010

STATUS:

METHOD: OPEN CUT

SURFACE EXCEPTION / DEPTH RESTRICTION

- Embraces the strata between a depth of 15 metres below the surface to a depth of 900 metres below Australian Height Datum (AHD).
- Embraces the surface and soil below thereof to a depth of 40 metres.
- Embraces the surface and soil below thereof to a depth of 900 metres below AHD.
- Embraces the strata between a depth of 15 metres below the surface to a depth of 40 metres below the surface.
- Embraces the strata between a depth of 40 metres below the surface to a depth of 900 metres below AHD.

NOTES:

LEASE PART TRANSFERRED TO ML 1711

THIS PLAN SUPERSEDES: M27095

Azimuth: TS 10472 COX[P] - TS 3357 NEGOA [P]

Plans used in the course of this survey/compilation
"SEE TABLE HEREIN"

Survey declared on this plan for lines
THE WHOLE

SHEET 2 OF 3

I **ROSS ANDREW PEASLEY**

of MUSWELLBROOK NSW 2333

a Surveyor Registered under the Surveying and Spatial Information Act 2002, hereby certify that the survey /compilation represented in this plan is accurate and has been completed in accordance with the Surveying and Spatial Information Regulation 2012 and the Surveyor General's Direction for Mining Surveys and was completed on 10TH JULY 2015

Signature : .....

RGSS Identification No : 162

FORM 10 M27367

Survey Calcs : .....

Plan Investigated : 13-08-2015

Plan Approved : 13-08-2015

Paper No : 15/1026

R 17009200
D 110097220

REFERENCE TO BOUNDARIES					
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
110-111	68° 05' 25"	194.89	139-140	277° 53' 40"	102.345
111-112	72° 00' 20"	58.40	140-143	256° 31' 40"	161.26
112-113	72° 00' 20"	51.48	143-144	256° 31' 40"	21.605 P.O
113-114	55° 14' 35"	31.89	160-151	187° 55'	39.610
114-115	55° 14' 35"	50.285	151-152	278° 01' 45"	100.615
115-116	52° 03' 45"	36.27	152-141	76° 31' 40"	108.057
116-117	52° 03' 50"	50.38	147-148	97° 47' 20"	46.12 P.O
117-118	47° 44' 45"	42.485	148-149	187° 47' 20"	43.905 P.O
118-119	46° 07' 50"	66.25	149-150	277° 47' 20"	46.12 P.O
119-120	40° 55' 10"	100.075	150-147	7° 47' 20"	43.905 P.O
120-121	40° 34' 05"	50.845	153-154	187° 50' 15"	63.570 P.O
121-122	40° 33' 55"	49.715	154-155	277° 50' 15"	63.770 P.O
122-123	43° 56' 00"	49.245	155-156	7° 50' 15"	63.570 P.O
123-124	44° 58' 30"	61.955	156-153	97° 50' 15"	63.770 P.O
124-125	49° 07' 40"	49.265	157-158	241° 54' 00"	102.68
125-126	57° 36' 15"	58.495	158-159	259° 53' 55"	46.995
126-127	57° 36' 15"	49.015			
127-128	68° 57' 05"	41.805			
128-129	68° 57' 00"	48.625			
129-130	84° 41' 50"	56.51			
130-131	84° 41' 50"	48.865			
138-139	187° 55'	39.610			

MGA CO-ORDINATES SCALE FACTOR:		
POINT	EASTING	NORTHING
1	299109.53	6434415.09
2	299110.40	6434394.95
3	299121.505	6433857.085
4	299115.355	6433709.13
5	299115.83	6433688.77
6	299126.46	6433230.105
7	299134.18	6432931.345
8	299136.44	6432598.705
9	299136.675	6432578.105
10	299144.295	6432469.59
11	299156.715	6431987.475
12	299156.765	6431985.485
13	299398.725	6431602.92
14	299560.275	6431185.98
109	293861.895	6432874.170
110	294014.110	6433981.270
111	294159.935	6434054.00
112	294250.485	6434072.040
113	294299.450	6434087.940
114	294325.650	6434106.125
115	294364.965	6434134.795
116	294395.575	6434157.095
117	294433.31	6434188.07
118	294466.76	6434216.64
119	294514.52	6434262.55
120	294580.075	6434338.175
121	294613.14	6434376.80
122	294645.475	6434414.57
123	294679.64	6434450.03
124	294723.435	6434493.86
125	294760.685	6434526.10
126	294810.08	6434557.44
127	294851.465	6434583.70
128	294890.485	6434598.715
129	294935.865	6434616.185
130	294992.135	6434621.405
131	295040.795	6434625.925
132	295103.425	6434617.475
133	295107.405	6434616.940
134	295108.295	6434573.400
135	295322.525	6434572.695
136	296419.010	6434599.690
137	297606.22	6434623.52
138	297698.94	6434613.75
139	298042.48	6434565.83
140	297403.08	6434577.23
141	297348.357	6434543.465
142	297225.230	6434534.650
145	296710.230	6434605.530
146	296581.405	6434602.945
147	297514.405	6434541.535
148	297560.100	6434535.285
149	297554.150	6434491.785
150	297508.450	6434498.035
151	297242.900	6434504.230
152	297243.270	6434518.287
153	296820.100	6434570.110
154	296811.435	6434907.130
155	296748.355	6434915.825
156	296756.925	6434578.805
157	297641.310	6434619.810
158	297590.730	6434571.440
159	297504.460	6434563.200
160	297348.355	6434543.465
161	298221.250	6434540.980
162	298000.050	6434454.520
163	297824.920	6434596.180
170	297794.69	6432768.145
171	298042.145	6432734.155
172	298135.75	6432720.955
173	298222.05	6432708.235
174	298637.30	6432669.935
175	298636.13	6432375.155
176	298648.86	6432077.30
177	298634.795	6432061.985
178	298634.52	6431998.215
179	298542.02	6432010.45
180	298473.665	6432005.905
181	298437.695	6431738.30
182	298089.55	6431785.22
183	297928.155	6431806.97
184	297666.99	6431846.615
185	297707.280	6432134.055
187	295263.27	6434149.60
188	294948.84	6434194.05
189	294508.08	6434256.36

NOTE: (1) ALL DISTANCES SHOWN HEREIN ARE GROUND DISTANCES
(2) GPS OBSERVATIONS HAVE BEEN USED FOR PART OF THE SURVEY SHOWN HEREON

NOTE: ALL DISTANCES SHOWN HEREIN ARE GROUND DISTANCES

Schedule 2

MINING LEASE CONDITIONS 2013

Definitions

1. **Notice to Landholders**
2. **Rehabilitation**
3. **Mining Operations Plan and Annual Rehabilitation Report**
4. **Compliance Report**
5. **Environmental Incident Report**
6. **Extraction Plan**
7. **Resource Recovery**
8. **Security**
9. **Cooperation Agreement**
10. **Spontaneous Combustion**
11. **Spontaneous Combustion**

Note: Exploration Reports (Geological and Geophysical)

Definitions:

Words used in this mining lease have the same meaning as defined in the *Mining Act 1992* except where otherwise defined below:

Act means the *Mining Act 1992.*

Department means the Division of Resources & Energy within the Department of Industry, Skills and Regional Development.

Environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Landholder for the purposes of these conditions does not include a secondary landholder and includes, in the case of exempted areas, the controlling body for the exempted area.

Material harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Minister means the Minister administering the Act.

Pollution incident has the same meaning as in the *Protection of the Environment Operations Act 1997.*

MINING LEASE CONDITIONS 2013

1. Notice to Landholders

(a) Within a period of three months from the date of grant/renewal of this mining lease, the lease holder must serve on each landholder a notice in writing indicating that this mining lease has been granted/renewed and whether the lease includes the surface. A plan identifying each landholder and individual land parcel subject to the lease area, and a description of the lease area must accompany the notice.

(b) If there are ten or more landholders, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this mining lease has been granted/renewed; state whether the lease includes the surface and must contain a plan and description of the lease area. If a notice is made under condition 1(b), compliance with condition 1(a) is not required.

2. Rehabilitation

Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.

3. Mining Operations Plan and Annual Rehabilitation Report

(a) The lease holder must comply with an approved Mining Operations Plan (MOP) in carrying out any significant surface disturbing activities, including mining operations, mining purposes and prospecting. The lease holder must apply to the Minister for approval of a MOP. An approved MOP must be in place prior to commencing any significant surface disturbing activities, including mining operations, mining purposes and prospecting.

(b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which:

(i) identifies areas that will be disturbed;

(ii) details the staging of specific mining operations, mining purposes and prospecting;

(iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use;

(iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and

(v) reflects the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979;*
- the *Protection of the Environment Operations Act 1997;* and

- any other approvals relevant to the development including the conditions of this mining lease.

(c) The MOP must be prepared in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* published on the Department's website at www.resources.nsw.gov.au/environment

(d) The lease holder may apply to the Minister to amend an approved MOP at any time.

(e) It is not a breach of this condition if:

(i) the operations which, but for this condition 3(e) would be a breach of condition 3(a), were necessary to comply with a lawful order or direction given under the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997*, the *Mine Health and Safety Act 2004 / Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007 / Coal Mine Health and Safety Regulation 2006* or the *Work Health and Safety Act 2011*; and

(ii) the Minister had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:

(i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;

(ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and

(iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resources.nsw.gov.au/environment.

Note: The Rehabilitation Report replaces the Annual Environmental Management Report.

4. Compliance Report

(a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.

(b) The Compliance Report must include:

(i) the extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under this mining lease, have or have not been complied with;

(ii) particulars of any non-compliance with any such conditions or provisions,

(iii) the reasons for any such non-compliance;

(iv) any action taken, or to be taken, to prevent any recurrence, or to mitigate the effects, of that non-compliance.

(c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.

(d) In addition to annual lodgement under condition 4(c) above, a Compliance Report:

(i) must accompany any application to renew this mining lease under the Act;

(ii) must accompany any application to transfer this mining lease under the Act; and

(iii) must accompany any application to cancel, or to partially cancel, this mining lease under the Act.

(e) Despite the submission of any Compliance Report under (c) or (d) above, the titleholder must lodge a Compliance Report with the Department at any date or dates otherwise required by the Minister.

(f) A Compliance Report must be submitted one month prior to the expiry of this mining lease, where the licence holder is not seeking to renew or cancel this mining lease.

5. Environmental Incident Report

(a) The lease holder must notify the Department of all:

(i) breaches of the conditions of this mining lease or breaches of the Act causing or threatening material harm to the environment; and

(ii) breaches of environmental protection legislation causing or threatening material harm to the environment (as defined in the *Protection of the Environment Operations Act 1997*),

arising in connection with significant surface disturbing activities, including mining operations, mining purposes and prospecting operations, under this mining lease. The notification must be given immediately after the lease holder becomes aware of the breach.

Note. Refer to www.resources.nsw.gov.au/environment for notification contact details.

(b) The lease holder must submit an Environmental Incident Report to the Department within seven (7) days of all breaches referred to in condition 5(a)(i) and (ii). The Environmental Incident Report must include:

(i) the details of the mining lease;

(ii) contact details for the lease holder;

(iii) a map identifying the location of the incident and where material harm to the environment has or is likely to occur;

(iv) a description of the nature of the incident or breach, likely causes and consequences;

(v) a timetable showing actions taken or planned to address the incident and to prevent future incidents or breaches referred to in 5(a).

(vi) a summary of all previous incidents or breaches which have occurred in the previous 12 months relating to significant surface disturbing activities, including mining operations, mining purposes and prospecting operations under this mining lease.

Note. The lease holder should have regard to any relevant Director General's guidelines in the preparation of an Environmental Incident Report. Refer to www.resources.nsw.gov.au/environment for further details.

(c) In addition to the requirements set out in conditions 5(a) and (b), the lease holder must immediately advise the Department of any notification made under section 148 of the *Protection of the Environment Operations Act 1997* arising in connection with significant surface disturbing activities including mining operations, mining purposes and prospecting operations, under this mining lease.

6. Extraction Plan

(a) In this condition:

(i) **approved Extraction Plan** means a plan, being:

A. an extraction plan or subsidence management plan approved in accordance with the conditions of a relevant development consent and provided to the Secretary; or

B. a subsidence management plan relating to the mining operations subject to this lease:

I. submitted to the Secretary on or before 31 December 2014; and

II. approved by the Secretary.

(ii) **relevant development consent** means a development consent or project approval issued under the Environmental Planning & Assessment Act 1979 relating to the mining operations subject to this lease.

(b) The lease holder must not undertake any underground mining operations that may cause subsidence except in accordance with an approved Extraction Plan.

(c) The lease holder must ensure that the approved Extraction Plan provides for the effective management of risks associated with any subsidence resulting from mining operations carried out under this lease.

(d) The lease holder must notify the Secretary within 48 hours of any:

(i) incident caused by subsidence which has a potential to expose any person to health and safety risks;

(ii) significant deviation from the predicted nature, magnitude, distribution, timing and duration of subsidence effects, and of the potential impacts and consequences of those deviations on built features and the health and safety of any person; or

(iii) significant failure or malfunction of a monitoring device or risk control measure set out in the approved Extraction Plan addressing:

A. built features;

B. public safety; or

C. subsidence monitoring.

7. Resource Recovery

The lease holder must optimise recovery of the minerals that are the subject of this mining lease to the extent economically feasible.

8. Group Security

The lease holder is required to provide and maintain a security deposit to secure funding for the fulfilment of obligations of all or any kind under the mining lease, including obligations of all or any kind under the mining lease that may arise in the future.

The amount of the security deposit to be provided as a group security has been assessed by the Minister at **$50,000**.

The leases covered by the group security include:

Mining Lease 1645, 1708, 1709 and 1713 (Act 1992)

9. Cooperation Agreement

The lease holder must make every reasonable attempt, and be able to demonstrate its attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as:

- access arrangements
- operational interaction procedures
- dispute resolution
- information exchange
- well location
- timing of drilling
- potential resource extraction conflicts; and
- rehabilitation issues.

10. Spontaneous Combustion

The lease holder must review and submit a Spontaneous Combustion Management Plan. The implementation and scope of this plan will be to the satisfaction of NSW Department of Industry.

11. Spontaneous Combustion

Coal or acid forming material left exposed by mining operations in the final void shall be covered with non-acid forming and non-combustible materials so as to reduce the possibility of leaking acid fluids and the possibility of self-heating of coal seams.

Exploration Reporting

Note: *Exploration Reports (Geological and Geophysical)*

The lease holder must lodge reports to the satisfaction of the Minister in accordance with section 163C of the Mining Act 1992 and in accordance with clause 57 of the Mining Regulation 2010.

Reports must be prepared in accordance with Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales (Department of Trade and Investment; Regional Infrastructure and Services 2010).

SPECIAL CONDITIONS

Note: The standard conditions apply to all mining leases. The Division of Resources & Energy (DRE) reserves the right to impose special conditions, based on individual circumstances, where appropriate.

Department of Industry
Resources & Energy

Transfer Approval Document

Reference: 16/416

TRANSFER OF MINING LEASE 1708 (ACT 1992)

Pursuant to Section 121(1)(a) of the *Mining Act 1992*, the Minister has approved the transfer of this authority from **COAL & ALLIED OPERATIONS PTY LTD** to **MACH ENERGY AUSTRALIA PTY LTD**.

TERMS OF APPROVAL OF TRANSFER OF AUTHORITY:

The terms of this approval take effect upon the registration of this transfer in accordance with Section 122(4) of the Act.

Transferee: MACH Energy Australia Pty Ltd
ACN 608 495 441

Area: The authority embraces an area of **9,951 square metres** as shown on the attached plan Catalogue No **M27299**.

Conditions: The conditions in the attached Schedule of Mining Lease Conditions 2013 herein and numbered 1 – 9 (inclusive).

ACCEPTANCE OF TERMS OF APPROVAL:

SIGNED BY

Anthony Roberts MP
Minister for Industry,
Resources and Energy

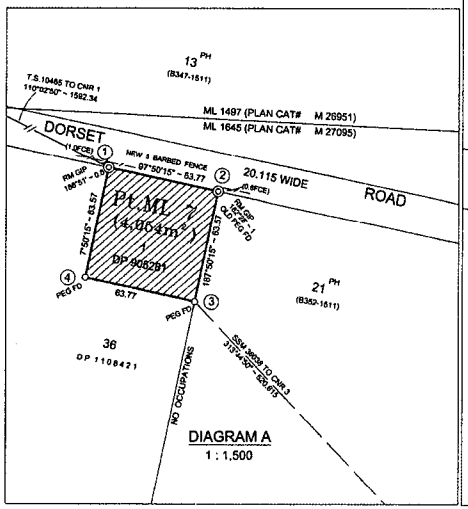
MACH Energy Australia Pty Ltd
(ACN 608 495 441)

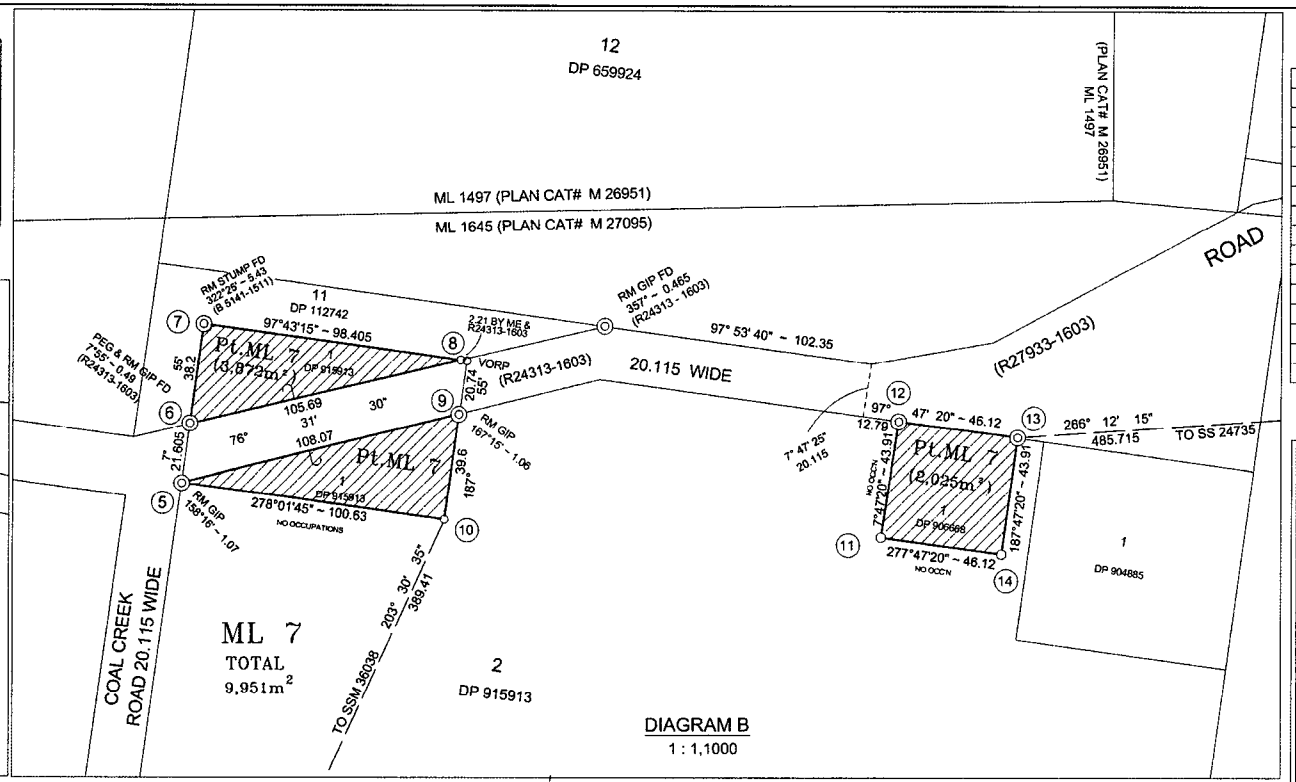
SURVEYING & SPATIAL INFORMATION REGULATIONS 2012 CLAUSE 35(1)(b) and CLAUSE 61(2)							
MARK	MGA CO-ORDINATES EASTING	NORTHING	ZONE	CLASS	ORDER	METHOD	ORIGIN
TS 10472 COX [P]	294321.914	6432041.745	56	B	2	FROM SCIMS	SCIMS
TS 10465 MARYVALE [P]	295261.003	6435124.627	56	B	2	FROM SCIMS	SCIMS
TS 3357 NEGOA [P]	300036.979	6432671.206	56	2A	0	FROM SCIMS	SCIMS
SS 24735	298044.780	6434567.440	56	U	U	GPS GNSS	FOUND
SS 36038	297187.550	6434157.120	56	U	U	GPS GNSS	FOUND

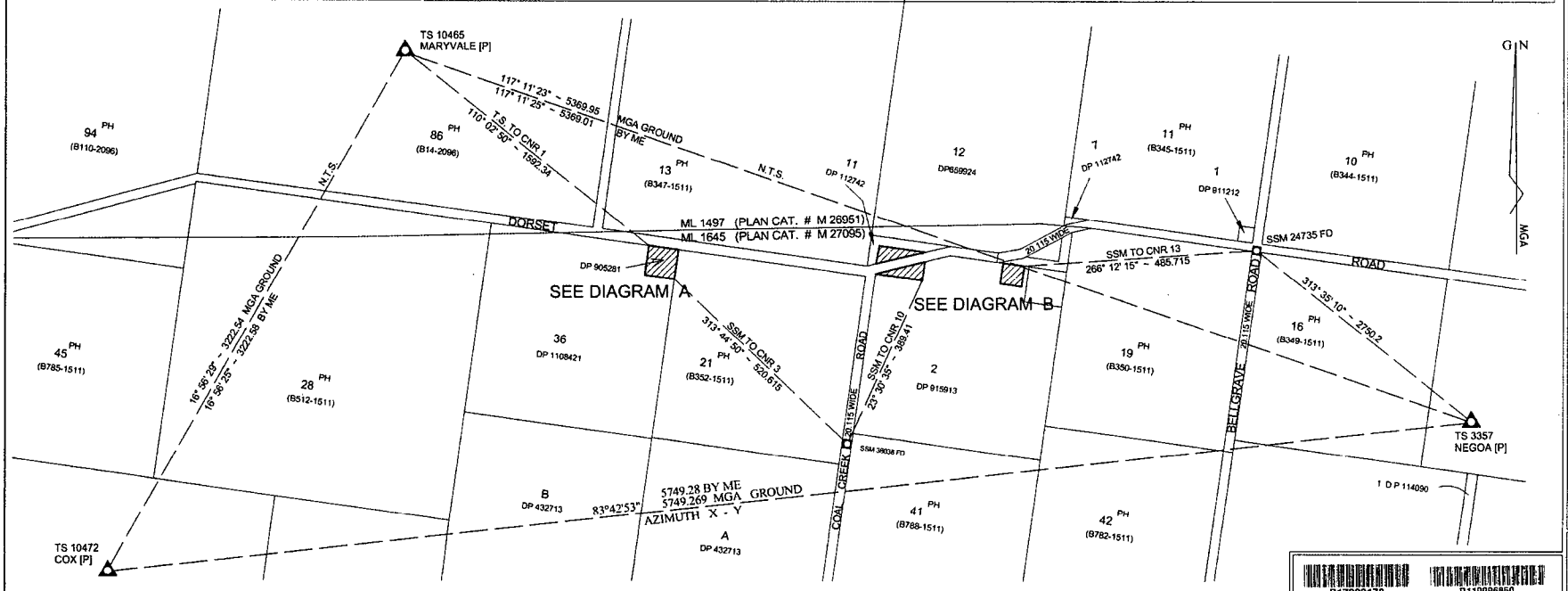
COMBINED SCALE FACTOR= 1.000062
SOURCE= MGA COORDINATES TAKEN FROM SCIMS
DATE= 30th SEPTEMBER 2013

ZONE:- 56 CSF 1.000062

SCHEDULE OF MGA CO-ORDINATES		
CORNER	EASTING	NORTHING
1	296756.925	6434578.805
2	296820.10	6434570.11
3	296811.435	6434507.130
4	296748.255	6434515.825
5	297243.270	6434518.285
6	297246.245	6434539.685
7	297251.510	6434577.525
8	297349.02	6434564.31
9	297348.355	6434543.465
10	297342.900	6434504.230
11	297508.45	6434498.035
12	297514.405	6434541.535
13	297560.10	6434535.20
14	297554.15	6434491.785







PLAN OF PORTION ML 7

PARISH: ELLIS

COUNTY: BRISBANE

MAP SHEET No. 9033-I-S

REDUCTION RATIO 1: 3,000 (A1)

MINING LEASE APPLICATION No. 422

MINING DIVISION: SINGLETON

APPLICANT: COAL & ALLIED OPERATIONS PTY LTD

APPLICATION DATE: 27-03-2012

MINING LEASE No. 1708 (Act 1992)

STATUS:

METHOD:OPEN CUT & UNDERGROUND

DEPTH RESTRICTION/SURFACE EXCEPTION

EMBRACES THE SURFACE AND SOIL BELOW THEREOF TO A DEPTH OF 15 METRES

NOTES: SHEET 1 OF 1

Azimuth: T.S.10472 COX [P] - T.S.3357 NEGOA [P]

Plans used in the course of this survey/compilation
PLAN CAT#M26951 & M27095

Survey declared on this plan for lines
THE WHOLE

I ROSS ANDREW PEASLEY
of BOARDMAN PEASLEY PTY LIMITED
a surveyor registered under the Surveying and Spatial Information Act 2002, hereby certify that the survey /compilation represented in this plan is accurate and has been completed in accordance with the Surveying and Spatial Information Regulation 2012 and the Surveyor General's Direction for Mining Surveys and was completed on 30TH SEPTEMBER 2013

Signature :

Surveyor's Reference : S4153-34

Survey Calcs :

Plan Investigated : 12.06.2014

Plan Approved : 17.06.2014

Paper No : T12-1506

M 27299

R17009178 D110096850

Schedule 2

MINING LEASE CONDITIONS 2013

Definitions

1. **Notice to Landholders**
2. **Rehabilitation**
3. **Mining Operations Plan and Annual Rehabilitation Report**
4. **Compliance Report**
5. **Environmental Incident Report**
6. **Extraction Plan**
7. **Resource Recovery**
8. **Security**
9. **Cooperation Agreement**

Note: Exploration Reports (Geological and Geophysical)

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Landholder for the purposes of these conditions does not include a secondary landholder and includes, in the case of exempted areas, the controlling body for the exempted area.

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MINING LEASE CONDITIONS 2013

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(b) If there are ten or more landholders, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this mining lease has been granted/renewed; state whether the lease includes the surface and must contain a plan and description of the lease area. If a notice is made under condition 1(b), compliance with condition 1(a) is not required.

2. Rehabilitation

Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.

3. Mining Operations Plan and Annual Rehabilitation Report

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(b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which:

(i) identifies areas that will be disturbed;

(ii) details the staging of specific mining operations, mining purposes and prospecting;

(iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use;

(iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and

(v) reflects the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979;*
- the *Protection of the Environment Operations Act 1997;* and

- any other approvals relevant to the development including the conditions of this mining lease.

(c) The MOP must be prepared in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* published on the Department's website at www.resources.nsw.gov.au/environment

(d) The lease holder may apply to the Minister to amend an approved MOP at any time.

(e) It is not a breach of this condition if:

(i) the operations which, but for this condition 3(e) would be a breach of condition 3(a), were necessary to comply with a lawful order or direction given under the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997,* the *Mine Health and Safety Act 2004 / Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007 / Coal Mine Health and Safety Regulation 2006* or the *Work Health and Safety Act 2011*; and

(ii) the Minister had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:

(i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;

(ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and

(iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resources.nsw.gov.au/environment.

Note: The Rehabilitation Report replaces the Annual Environmental Management Report.

4. Compliance Report

(a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.

(b) The Compliance Report must include:

(i) the extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under this mining lease, have or have not been complied with;

(ii) particulars of any non-compliance with any such conditions or provisions,

(iii) the reasons for any such non-compliance;

(iv) any action taken, or to be taken, to prevent any recurrence, or to mitigate the effects, of that non-compliance.

(c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.

(d) In addition to annual lodgement under condition 4(c) above, a Compliance Report:

(i) must accompany any application to renew this mining lease under the Act;

(ii) must accompany any application to transfer this mining lease under the Act; and

(iii) must accompany any application to cancel, or to partially cancel, this mining lease under the Act.

(e) Despite the submission of any Compliance Report under (c) or (d) above, the titleholder must lodge a Compliance Report with the Department at any date or dates otherwise required by the Minister.

(f) A Compliance Report must be submitted one month prior to the expiry of this mining lease, where the licence holder is not seeking to renew or cancel this mining lease.

5. Environmental Incident Report

(a) The lease holder must notify the Department of all:

(i) breaches of the conditions of this mining lease or breaches of the Act causing or threatening material harm to the environment; and

(ii) breaches of environmental protection legislation causing or threatening material harm to the environment (as defined in the *Protection of the Environment Operations Act 1997*),

arising in connection with significant surface disturbing activities, including mining operations, mining purposes and prospecting operations, under this mining lease. The notification must be given immediately after the lease holder becomes aware of the breach.

Note. Refer to www.resources.nsw.gov.au/environment for notification contact details.

(b) The lease holder must submit an Environmental Incident Report to the Department within seven (7) days of all breaches referred to in condition 5(a)(i) and (ii). The Environmental Incident Report must include:

(i) the details of the mining lease;

(ii) contact details for the lease holder;

(iii) a map identifying the location of the incident and where material harm to the environment has or is likely to occur;

(iv) a description of the nature of the incident or breach, likely causes and consequences;

(v) a timetable showing actions taken or planned to address the incident and to prevent future incidents or breaches referred to in 5(a).

(vi) a summary of all previous incidents or breaches which have occurred in the previous 12 months relating to significant surface disturbing activities, including mining operations, mining purposes and prospecting operations under this mining lease.

Note. The lease holder should have regard to any relevant Director General's guidelines in the preparation of an Environmental Incident Report. Refer to www.resources.nsw.gov.au/environment for further details.

(c) In addition to the requirements set out in conditions 5(a) and (b), the lease holder must immediately advise the Department of any notification made under section 148 of the *Protection of the Environment Operations Act 1997* arising in connection with significant surface disturbing activities including mining operations, mining purposes and prospecting operations, under this mining lease.

6. Extraction Plan

(a) In this condition:

(i) **approved Extraction Plan** means a plan, being:

A. an extraction plan or subsidence management plan approved in accordance with the conditions of a relevant development consent and provided to the Secretary; or

B. a subsidence management plan relating to the mining operations subject to this lease:

I. submitted to the Secretary on or before 31 December 2014; and

II. approved by the Secretary.

(ii) **relevant development consent** means a development consent or project approval issued under the Environmental Planning & Assessment Act 1979 relating to the mining operations subject to this lease.

(b) The lease holder must not undertake any underground mining operations that may cause subsidence except in accordance with an approved Extraction Plan.

(c) The lease holder must ensure that the approved Extraction Plan provides for the effective management of risks associated with any subsidence resulting from mining operations carried out under this lease.

(d) The lease holder must notify the Secretary within 48 hours of any:

(i) incident caused by subsidence which has a potential to expose any person to health and safety risks;

(ii) significant deviation from the predicted nature, magnitude, distribution, timing and duration of subsidence effects, and of the potential impacts and consequences of those deviations on built features and the health and safety of any person; or

(iii) significant failure or malfunction of a monitoring device or risk control measure set out in the approved Extraction Plan addressing:

A. built features;

B. public safety; or

C. subsidence monitoring.

7. Resource Recovery

The lease holder must optimise recovery of the minerals that are the subject of this mining lease to the extent economically feasible.

8. Group Security

The lease holder is required to provide and maintain a security deposit to secure funding for the fulfilment of obligations of all or any kind under the mining lease, including obligations of all or any kind under the mining lease that may arise in the future.

The amount of the security deposit to be provided as a group security has been assessed by the Minister at **$50,000**.

The leases covered by the group security include:

Mining Lease 1645, 1708, 1709 and 1713 (Act 1992)

9. Cooperation Agreement

The lease holder must make every reasonable attempt, and be able to demonstrate its attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as:

- access arrangements
- operational interaction procedures
- dispute resolution
- information exchange
- well location
- timing of drilling
- potential resource extraction conflicts; and
- rehabilitation issues.

Exploration Reporting

Note: *Exploration Reports (Geological and Geophysical)*

The lease holder must lodge reports to the satisfaction of the Minister in accordance with section 163C of the Mining Act 1992 and in accordance with clause 57 of the Mining Regulation 2010.

Reports must be prepared in accordance with Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales (Department of Trade and Investment; Regional Infrastructure and Services 2010).

SPECIAL CONDITIONS

Note: The standard conditions apply to all mining leases. The Division of Resources & Energy (DRE) reserves the right to impose special conditions, based on individual circumstances, where appropriate.

Department of Industry
Resources & Energy

Transfer Approval Document

Reference: 16/416

TRANSFER OF MINING LEASE 1709 (ACT 1992)

Pursuant to Section 121(1)(a) of the *Mining Act 1992*, the Minister has approved the transfer of this authority from **COAL & ALLIED OPERATIONS PTY LTD** to **MACH ENERGY AUSTRALIA PTY LTD**.

TERMS OF APPROVAL OF TRANSFER OF AUTHORITY:

The terms of this approval take effect upon the registration of this transfer in accordance with Section 122(4) of the Act.

Transferee: MACH Energy Australia Pty Ltd
ACN 608 495 441

Area: The authority embraces an area of **81.7 hectares** as shown on the attached plan Catalogue No **M27300**.

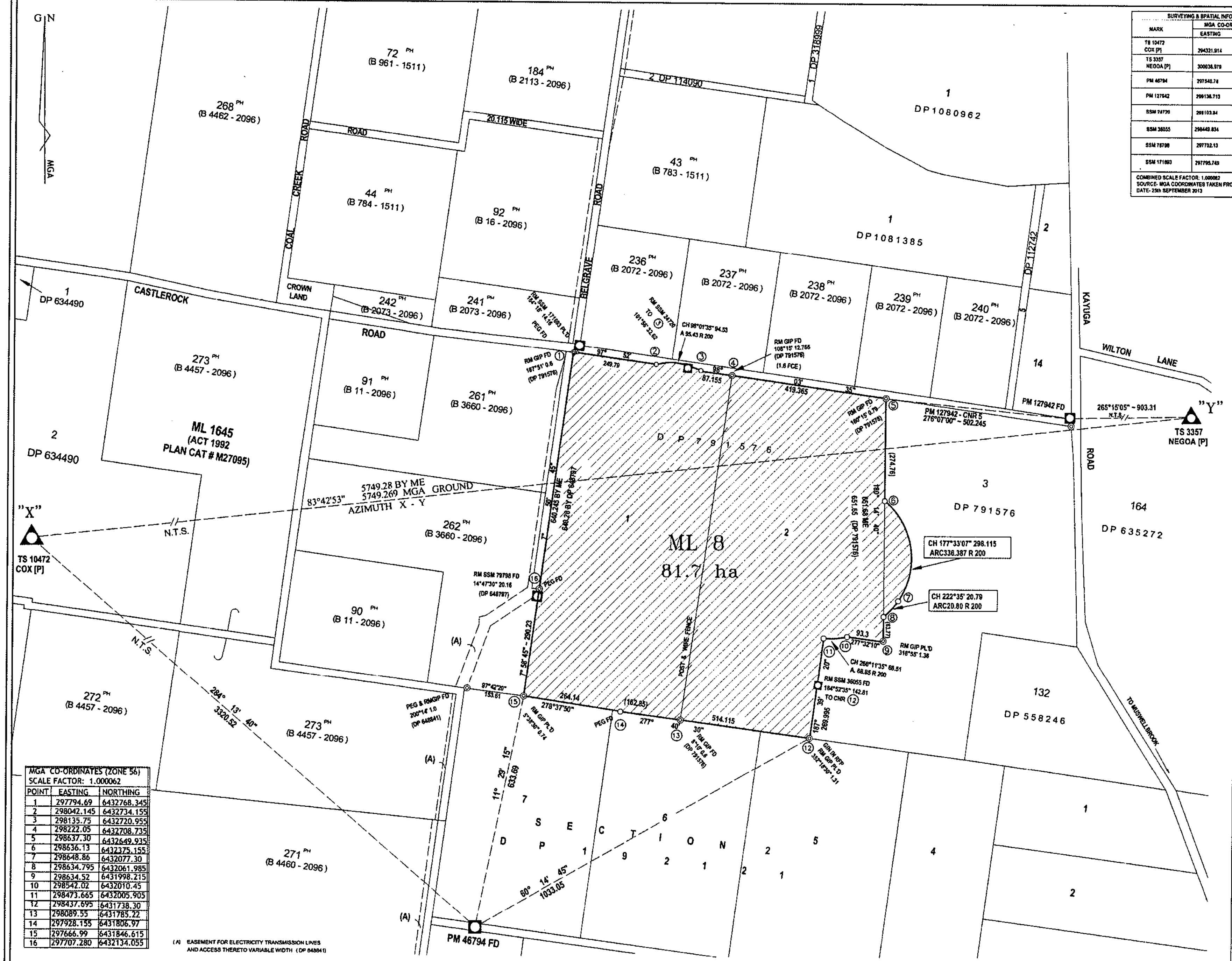
Conditions: The conditions in the attached Schedule of Mining Lease Conditions 2013 herein and numbered 1 – 9 (inclusive).

ACCEPTANCE OF TERMS OF APPROVAL:

SIGNED BY

Anthony Roberts MP
Minister for Industry,
Resources and Energy

MACH Energy Australia Pty Ltd
(ACN 608 495 441)



SURVEYING & SPATIAL INFORMATION REGULATION 2012 CLAUSE 35(1)(b) and CLAUSE 61(2)							
MARK	MGA CO-ORDINATES EASTING	MGA CO-ORDINATES NORTHING	ZONE	CLASS	ORDER	METHOD	ORIGIN
TS 10472 COX [P]	294321.914	6432041.745	56	B	2	FROM SCIMS	SCIMS
TS 3357 NEGOA [P]	300038.979	6432671.206	56	2A	0	FROM SCIMS	SCIMS
PM 46794	297540.74	6431225.58	56	C	N/A	RTK GPS	FOUND
PM 127942	299136.713	6432808.414	56	2A	0	FROM SCIMS	SCIMS
SSM 74770	298103.84	6432727.70	56	C	N/A	RTK GPS	FOUND
SSM 36055	298449.834	6431880.803	56	C	N/A	RTK GPS	FOUND
SSM 79798	297702.13	6432114.55	56	C	N/A	RTK GPS	FOUND
SSM 171693	297795.749	6432782.483	56	C	N/A	RTK GPS	PLACED

COMBINED SCALE FACTOR: 1.000062
SOURCE- MGA COORDINATES TAKEN FROM SCIMS
DATE- 25th SEPTEMBER 2013

MGA CO-ORDINATES (ZONE 56) SCALE FACTOR: 1.000062		
POINT	EASTING	NORTHING
1	297794.69	6432768.345
2	298042.145	6432734.155
3	298135.75	6432720.955
4	298222.05	6432708.735
5	298637.30	6432649.935
6	298636.13	6432375.155
7	298648.86	6432077.30
8	298634.795	6432061.985
9	298634.52	6431998.215
10	298542.02	6432010.45
11	298473.665	6432005.905
12	298437.695	6431738.30
13	298089.55	6431785.22
14	297928.155	6431806.97
15	297666.99	6431846.615
16	297707.280	6432134.055

(A) EASEMENT FOR ELECTRICITY TRANSMISSION LINES AND ACCESS THERETO VARIABLE WIDTH (DP 648841)

NOTE: (1) ALL DISTANCES SHOWN HEREIN ARE GROUND DISTANCES
(2) GPS OBSERVATIONS HAVE BEEN USED FOR PART OF THE SURVEY SHOWN HEREON IN ACCORDANCE WITH THE SURVEYOR GENERAL NSW DIRECTIONS FOR GPS SURVEYS

PLAN OF PORTION ML 8

PARISH: ELLIS
COUNTY: BRISBANE
MAP SHEET No. 9033-1-S
REDUCTION RATIO 1: 5,000 (A1)
MINING LEASE APPLICATION No. 423
MINING DIVISION: SINGLETON
APPLICANT: COAL & ALLIED OPERATIONS PTY LTD
APPLICATION DATE: 27-03-2012
MINING LEASE No. 1709 (Act 1992)
STATUS:
METHOD: OPEN CUT & UNDERGROUND

DEPTH RESTRICTION/SURFACE EXCEPTION
Embraces the surface and soil below thereof to a depth of 15 metres.

NOTES:
SHEET 1 OF 1

Azimuth: TS 10472 COX [P] to TS 3357 NEGOA [P]

Plans used in the course of this survey/~~compilation~~. PLAN CAT# M27095 (ML1645) & DP 791576

Survey declared on this plan for lines LINES 1 TO 16 & PM CONNECTIONS

I ROSS ANDREW PEASLEY of BOARDMAN PEASLEY PTY LIMITED a surveyor registered under the Surveying and Spatial Information Act 2002, hereby certify that the survey/~~compilation~~ represented in this plan is accurate and has been completed in accordance with the Surveying and Spatial Information Regulation 2012 and the Surveyor General's Direction for Mining Surveys and was completed on 25TH SEPTEMBER 2013

Signature :
Surveyors Reference : S4153-35

Survey Calcs :
Plan Investigated : 12-06-2014
Plan Approved : 17-06-2014
Paper No : T12 - 1507
FORM9

R17009179
D110096860

M 27300

Schedule 2

MINING LEASE CONDITIONS 2013

Definitions

1. **Notice to Landholders**
2. **Rehabilitation**
3. **Mining Operations Plan and Annual Rehabilitation Report**
4. **Compliance Report**
5. **Environmental Incident Report**
6. **Extraction Plan**
7. **Resource Recovery**
8. **Security**
9. **Cooperation Agreement**

Note: Exploration Reports (Geological and Geophysical)

Definitions:

Words used in this mining lease have the same meaning as defined in the *Mining Act 1992* except where otherwise defined below:

Act means the *Mining Act 1992.*

Department means the Division of Resources & Energy within the Department of Industry, Skills and Regional Development.

Environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Landholder for the purposes of these conditions does not include a secondary landholder and includes, in the case of exempted areas, the controlling body for the exempted area.

Material harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Minister means the Minister administering the Act.

Pollution incident has the same meaning as in the *Protection of the Environment Operations Act 1997.*

MINING LEASE CONDITIONS 2013

1. Notice to Landholders

(a) Within a period of three months from the date of grant/renewal of this mining lease, the lease holder must serve on each landholder a notice in writing indicating that this mining lease has been granted/renewed and whether the lease includes the surface. A plan identifying each landholder and individual land parcel subject to the lease area, and a description of the lease area must accompany the notice.

(b) If there are ten or more landholders, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this mining lease has been granted/renewed; state whether the lease includes the surface and must contain a plan and description of the lease area. If a notice is made under condition 1(b), compliance with condition 1(a) is not required.

2. Rehabilitation

Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.

3. Mining Operations Plan and Annual Rehabilitation Report

(a) The lease holder must comply with an approved Mining Operations Plan (MOP) in carrying out any significant surface disturbing activities, including mining operations, mining purposes and prospecting. The lease holder must apply to the Minister for approval of a MOP. An approved MOP must be in place prior to commencing any significant surface disturbing activities, including mining operations, mining purposes and prospecting.

(b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which:

(i) identifies areas that will be disturbed;

(ii) details the staging of specific mining operations, mining purposes and prospecting;

(iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use;

(iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and

(v) reflects the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979;*
- the *Protection of the Environment Operations Act 1997;* and

- any other approvals relevant to the development including the conditions of this mining lease.

(c) The MOP must be prepared in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* published on the Department's website at www.resources.nsw.gov.au/environment

(d) The lease holder may apply to the Minister to amend an approved MOP at any time.

(e) It is not a breach of this condition if:

(i) the operations which, but for this condition 3(e) would be a breach of condition 3(a), were necessary to comply with a lawful order or direction given under the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997*, the *Mine Health and Safety Act 2004 / Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007 / Coal Mine Health and Safety Regulation 2006* or the *Work Health and Safety Act 2011*; and

(ii) the Minister had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:

(i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;

(ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and

(iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resources.nsw.gov.au/environment.

Note: The Rehabilitation Report replaces the Annual Environmental Management Report.

4. Compliance Report

(a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.

(b) The Compliance Report must include:

(i) the extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under this mining lease, have or have not been complied with;

(ii) particulars of any non-compliance with any such conditions or provisions,

(iii) the reasons for any such non-compliance;

(iv) any action taken, or to be taken, to prevent any recurrence, or to mitigate the effects, of that non-compliance.

(c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.

(d) In addition to annual lodgement under condition 4(c) above, a Compliance Report:

(i) must accompany any application to renew this mining lease under the Act;

(ii) must accompany any application to transfer this mining lease under the Act; and

(iii) must accompany any application to cancel, or to partially cancel, this mining lease under the Act.

(e) Despite the submission of any Compliance Report under (c) or (d) above, the titleholder must lodge a Compliance Report with the Department at any date or dates otherwise required by the Minister.

(f) A Compliance Report must be submitted one month prior to the expiry of this mining lease, where the licence holder is not seeking to renew or cancel this mining lease.

5. Environmental Incident Report

(a) The lease holder must notify the Department of all:

(i) breaches of the conditions of this mining lease or breaches of the Act causing or threatening material harm to the environment; and

(ii) breaches of environmental protection legislation causing or threatening material harm to the environment (as defined in the *Protection of the Environment Operations Act 1997*),

arising in connection with significant surface disturbing activities, including mining operations, mining purposes and prospecting operations, under this mining lease. The notification must be given immediately after the lease holder becomes aware of the breach.

Note. Refer to www.resources.nsw.gov.au/environment for notification contact details.

(b) The lease holder must submit an Environmental Incident Report to the Department within seven (7) days of all breaches referred to in condition 5(a)(i) and (ii). The Environmental Incident Report must include:

(i) the details of the mining lease;

(ii) contact details for the lease holder;

(iii) a map identifying the location of the incident and where material harm to the environment has or is likely to occur;

(iv) a description of the nature of the incident or breach, likely causes and consequences;

(v) a timetable showing actions taken or planned to address the incident and to prevent future incidents or breaches referred to in 5(a).

(vi) a summary of all previous incidents or breaches which have occurred in the previous 12 months relating to significant surface disturbing activities, including mining operations, mining purposes and prospecting operations under this mining lease.

Note. The lease holder should have regard to any relevant Director General's guidelines in the preparation of an Environmental Incident Report. Refer to www.resources.nsw.gov.au/environment for further details.

(c) In addition to the requirements set out in conditions 5(a) and (b), the lease holder must immediately advise the Department of any notification made under section 148 of the *Protection of the Environment Operations Act 1997* arising in connection with significant surface disturbing activities including mining operations, mining purposes and prospecting operations, under this mining lease.

6. Extraction Plan

(a) In this condition:

(i) **approved Extraction Plan** means a plan, being:

A. an extraction plan or subsidence management plan approved in accordance with the conditions of a relevant development consent and provided to the Secretary; or

B. a subsidence management plan relating to the mining operations subject to this lease:

I. submitted to the Secretary on or before 31 December 2014; and

II. approved by the Secretary.

(ii) **relevant development consent** means a development consent or project approval issued under the Environmental Planning & Assessment Act 1979 relating to the mining operations subject to this lease.

(b) The lease holder must not undertake any underground mining operations that may cause subsidence except in accordance with an approved Extraction Plan.

(c) The lease holder must ensure that the approved Extraction Plan provides for the effective management of risks associated with any subsidence resulting from mining operations carried out under this lease.

(d) The lease holder must notify the Secretary within 48 hours of any:

(i) incident caused by subsidence which has a potential to expose any person to health and safety risks;

(ii) significant deviation from the predicted nature, magnitude, distribution, timing and duration of subsidence effects, and of the potential impacts and consequences of those deviations on built features and the health and safety of any person; or

(iii) significant failure or malfunction of a monitoring device or risk control measure set out in the approved Extraction Plan addressing:

A. built features;

B. public safety; or

C. subsidence monitoring.

7. Resource Recovery

The lease holder must optimise recovery of the minerals that are the subject of this mining lease to the extent economically feasible.

8. Group Security

The lease holder is required to provide and maintain a security deposit to secure funding for the fulfilment of obligations of all or any kind under the mining lease, including obligations of all or any kind under the mining lease that may arise in the future.

The amount of the security deposit to be provided as a group security has been assessed by the Minister at **$50,000**.

The leases covered by the group security include:

Mining Lease 1645, 1708, 1709 and 1713 (Act 1992)

9. Cooperation Agreement

The lease holder must make every reasonable attempt, and be able to demonstrate its attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as:

- access arrangements
- operational interaction procedures
- dispute resolution
- information exchange
- well location
- timing of drilling
- potential resource extraction conflicts; and
- rehabilitation issues.

Exploration Reporting

Note: *Exploration Reports (Geological and Geophysical)*

The lease holder must lodge reports to the satisfaction of the Minister in accordance with section 163C of the Mining Act 1992 and in accordance with clause 57 of the Mining Regulation 2010.

Reports must be prepared in accordance with Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales (Department of Trade and Investment; Regional Infrastructure and Services 2010).

SPECIAL CONDITIONS

Note: The standard conditions apply to all mining leases. The Division of Resources & Energy (DRE) reserves the right to impose special conditions, based on individual circumstances, where appropriate.

Department of Industry
Resources & Energy

Transfer Approval Document

Reference: 16/416

TRANSFER OF MINING LEASE 1713 (ACT 1992)

Pursuant to Section 121(1)(a) of the *Mining Act 1992*, the Minister has approved the transfer of this authority from **COAL & ALLIED OPERATIONS PTY LTD** to **MACH ENERGY AUSTRALIA PTY LTD**.

TERMS OF APPROVAL OF TRANSFER OF AUTHORITY:

The terms of this approval take effect upon the registration of this transfer in accordance with Section 122(4) of the Act.

Transferee: MACH Energy Australia Pty Ltd
ACN 608 495 441

Area: The authority embraces an area of **1.136 hectares** as shown on the attached plan Catalogue No **M27219**.

Conditions: The conditions in the attached Schedule of Mining Lease Conditions 2013 herein and numbered 1 – 9 (inclusive).

ACCEPTANCE OF TERMS OF APPROVAL:

SIGNED BY

Anthony Roberts MP
Minister for Industry,
Resources and Energy

MACH Energy Australia Pty Ltd
(ACN 608 495 441)

MGA CO-ORDINATES SCALE FACTOR: 1.000062 (ZONE 56)		
POINT	EASTING	NORTHING
1	293455.435	6429152.670
2	293333.785	6429167.265
3	293313.805	6429169.595
4	293281.540	6429173.480
5	293290.295	6429234.020
6	293231.400	6429240.275
7	293223.550	6429243.395
8	293002.555	6429274.400
9	292945.080	6429278.050
10	292918.900	6429273.470
11	292883.580	6429277.225
12	292922.305	6429284.365
13	292933.015	6429285.665
14	292965.815	6429287.290
15	292988.560	6429286.845
16	293026.790	6429283.185
17	293227.130	6429256.290
18	293249.645	6429252.095
19	293270.735	6429246.865
20	293302.650	6429235.650
21	293341.350	6429217.945
22	293407.640	6429184.165
23	293434.020	6429173.380
24	293444.020	6429169.805

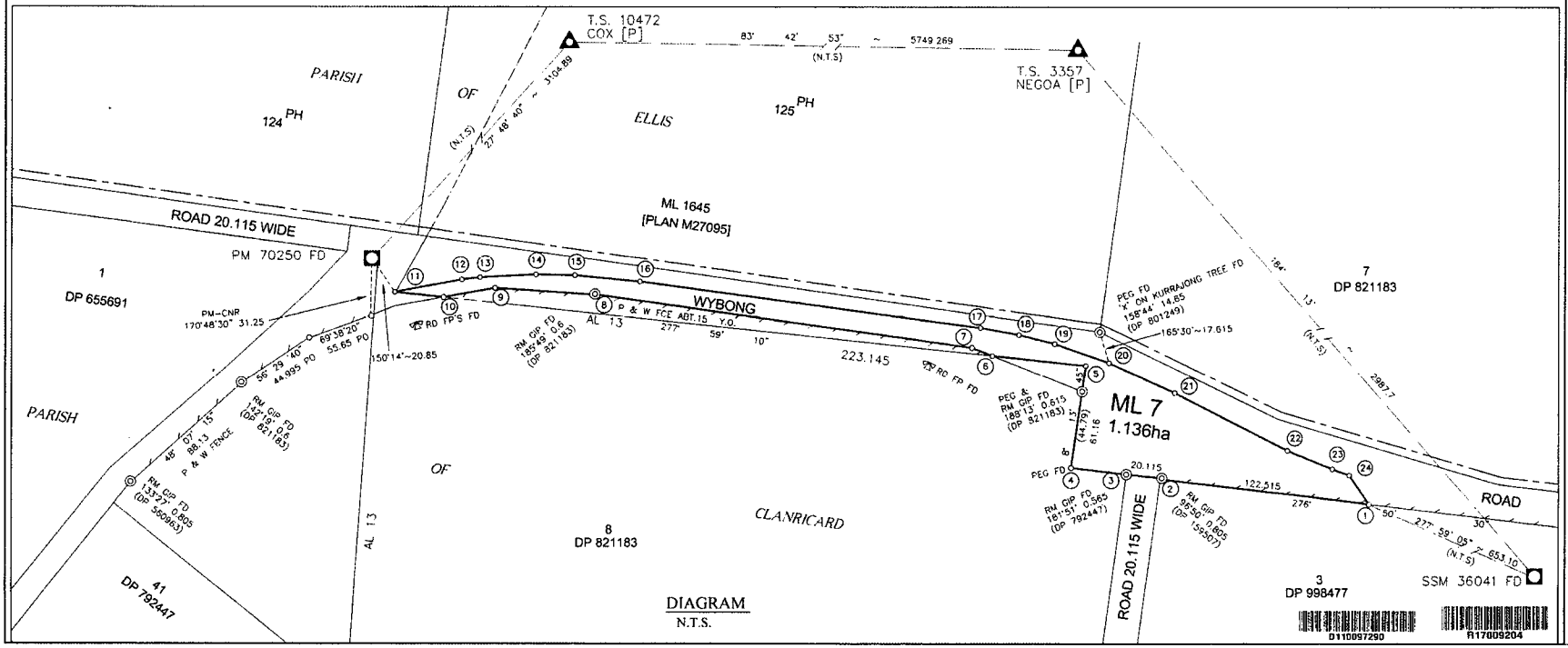
REFERENCE TO BOUNDARIES					
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
1 - 2	276° 50' 30"	122.515	13 - 14	87° 09' 35"	32.840
2 - 3	276° 39' 40"	20.115	14 - 15	91° 07' 35"	22.750
3 - 4	276° 52' 00"	32.50	15 - 16	95° 28' 15"	38.400
4 - 5	8° 13' 45"	61.160	16 - 17	97° 38' 45"	202.125
5 - 6	276° 03' 50"	59.225	17 - 18	100° 32' 40"	22.905
6 - 7	291° 40' 50"	8.445	18 - 19	103° 56' 25"	21.725
7 - 8	277° 59' 10"	223.145	19 - 20	109° 21' 20"	33.830
8 - 9	273° 38' 00"	57.590	20 - 21	114° 35' 10"	42.555
9 - 10	260° 04' 40"	26.575	21 - 22	117° 00' 15"	74.395
10 - 11	276° 03' 50"	35.520	22 - 23	112° 14' 05"	28.500
11 - 12	79° 33' 15"	39.375	23 - 24	109° 40' 30"	10.620
12 - 13	83° 05' 05"	10.790	24 - 1	146° 19' 35"	20.590

NOTE. (1) ALL DISTANCES SHOWN HEREIN ARE GROUND DISTANCES
(2) GPS OBSERVATIONS HAVE BEEN USED FOR PART OF THE SURVEY SHOWN HEREON IN ACCORDANCE WITH THE SURVEYOR GENERALS DIRECTIONS

G N
MGA

SURVEYING REGULATIONS 2006 CLAUSE 35(1)(b) and CLAUSE 81(2)							
MARK	MGA CO-ORDINATES EASTING	MGA CO-ORDINATES NORTHING	ZONE	CLASS	ORDER	METHOD	ORIGIN
TS 10472 COX [P]	294321.914	6432041.745	56	B	2	From SCIMS	SCIMS
TS 3357 NEGOA [P]	300036.979	6432871.206	56	2A	0	From SCIMS	SCIMS
TS 3639 OVERTON [P]	297835.972	6427872.656	56	2A	0	From SCIMS	SCIMS
SSM 3212	219672.660	6428303.748	56	U	N/A	RTK GPS	FOUND
PM 70250	292873.223	6429295.323	56	C	N/A	RTK GPS	FOUND
SSM 36041	294102.245	6429061.944	56	C	N/A	RTK GPS	FOUND
SSM 78795	295909.678	6428803.415	56	C	N/A	RTK GPS	FOUND
SSM 160545	291988.806	6427967.936	56	U	N/A	RTK GPS	FOUND
SSM 160546	292256.361	6427544.314	56	U	N/A	RTK GPS	FOUND
SSM 160549	292628.180	6427308.453	56	U	N/A	RTK GPS	FOUND
SSMM 160550	292764.400	6426879.746	56	U	N/A	RTK GPS	FOUND

COMBINED SCALE FACTOR 1.000067 (AVERAGE ADOPTED OVERSITE)
SOURCE- MGA COORDINATES TAKEN FROM SCIMS
DATE- 24th MAY 2012



PLAN OF PORTION ML 7

PARISH: CLANRICARD

COUNTY: BRISBANE

MAP SHEET No. 9033-2-N

REDUCTION RATIO 1: 15 000

MINING LEASE APPLICATION No. 402

MINING DIVISION: SINGLETON

APPLICANT: COAL & ALLIED OPERATIONS PTY LTD

APPLICATION DATE: 04-05-2011

MINING LEASE No. 1713 (Act 1992)

STATUS:

METHOD:OPEN CUT & UNDERGROUND

DEPTH RESTRICTION/SURFACE EXCEPTION
☐ Embraces the surface and soil below thereof to a depth of 900 metres below Australian Height Datum (AHD).

NOTES:

SHEET 1 OF 1

Azimuth: TS 10472 COX [P] - TS 3357 NEGOA [P]

Plans used in the course of this survey/compilation M 266168, M 27095, DP 159807, DP 560983, DP 792447, DP 801249, DP 821183

Survey declared on this plan for lines JOINING POINTS 1 TO 24 & PERMANENT MARK CONNECTIONS

I, ROSS ANDREW PEASLEY
of BOARDMAN PEASLEY PTY LIMITED
a Surveyor registered under the Surveying & Spatial Information Act 2002, as amended hereby certify that the survey/compilation represented in this plan is accurate and has been completed in accordance with the Surveying & Spatial Information Regulation 2006 and the Surveyor General's Direction for Mining Surveys and was completed on 24th MAY 2012

Signature : Ross Peasley

Surveyors Reference : 54153-25

Survey Calcs : 12/10/2012

Plan Investigated : 12/10/2012

Plan Approved : 12/10/2012

Paper No : 10/6581

D110097290

R17009204

M 27219

Schedule 2

MINING LEASE CONDITIONS 2013

Definitions

1. **Notice to Landholders**
2. **Rehabilitation**
3. **Mining Operations Plan and Annual Rehabilitation Report**
4. **Compliance Report**
5. **Environmental Incident Report**
6. **Extraction Plan**
7. **Resource Recovery**
8. **Security**
9. **Cooperation Agreement**

Note: Exploration Reports (Geological and Geophysical)

Definitions:

Words used in this mining lease have the same meaning as defined in the *Mining Act 1992* except where otherwise defined below:

Act means the *Mining Act 1992*.

Department means the Division of Resources & Energy within the Department of Industry, Skills and Regional Development.

Environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.

Harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.

Landholder for the purposes of these conditions does not include a secondary landholder and includes, in the case of exempted areas, the controlling body for the exempted area.

Material harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.

Minister means the Minister administering the Act.

Pollution incident has the same meaning as in the *Protection of the Environment Operations Act 1997*.

MINING LEASE CONDITIONS 2013

1. Notice to Landholders

(a) Within a period of three months from the date of grant/renewal of this mining lease, the lease holder must serve on each landholder a notice in writing indicating that this mining lease has been granted/renewed and whether the lease includes the surface. A plan identifying each landholder and individual land parcel subject to the lease area, and a description of the lease area must accompany the notice.

(b) If there are ten or more landholders, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this mining lease has been granted/renewed; state whether the lease includes the surface and must contain a plan and description of the lease area. If a notice is made under condition 1(b), compliance with condition 1(a) is not required.

2. Rehabilitation

Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.

3. Mining Operations Plan and Annual Rehabilitation Report

(a) The lease holder must comply with an approved Mining Operations Plan (MOP) in carrying out any significant surface disturbing activities, including mining operations, mining purposes and prospecting. The lease holder must apply to the Minister for approval of a MOP. An approved MOP must be in place prior to commencing any significant surface disturbing activities, including mining operations, mining purposes and prospecting.

(b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which:

(i) identifies areas that will be disturbed;

(ii) details the staging of specific mining operations, mining purposes and prospecting;

(iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use;

(iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and

(v) reflects the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979;*
- the *Protection of the Environment Operations Act 1997;* and

- any other approvals relevant to the development including the conditions of this mining lease.

(c) The MOP must be prepared in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* published on the Department's website at www.resources.nsw.gov.au/environment

(d) The lease holder may apply to the Minister to amend an approved MOP at any time.

(e) It is not a breach of this condition if:

(i) the operations which, but for this condition 3(e) would be a breach of condition 3(a), were necessary to comply with a lawful order or direction given under the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997,* the *Mine Health and Safety Act 2004 / Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007 / Coal Mine Health and Safety Regulation 2006* or the *Work Health and Safety Act 2011*; and

(ii) the Minister had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:

(i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;

(ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and

(iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resources.nsw.gov.au/environment.

Note: The Rehabilitation Report replaces the Annual Environmental Management Report.

4. Compliance Report

(a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.

(b) The Compliance Report must include:

(i) the extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under this mining lease, have or have not been complied with;

(ii) particulars of any non-compliance with any such conditions or provisions,

(iii) the reasons for any such non-compliance;

(iv) any action taken, or to be taken, to prevent any recurrence, or to mitigate the effects, of that non-compliance.

(c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.

(d) In addition to annual lodgement under condition 4(c) above, a Compliance Report:

(i) must accompany any application to renew this mining lease under the Act;

(ii) must accompany any application to transfer this mining lease under the Act; and

(iii) must accompany any application to cancel, or to partially cancel, this mining lease under the Act.

(e) Despite the submission of any Compliance Report under (c) or (d) above, the titleholder must lodge a Compliance Report with the Department at any date or dates otherwise required by the Minister.

(f) A Compliance Report must be submitted one month prior to the expiry of this mining lease, where the licence holder is not seeking to renew or cancel this mining lease.

5. Environmental Incident Report

(a) The lease holder must notify the Department of all:

(i) breaches of the conditions of this mining lease or breaches of the Act causing or threatening material harm to the environment; and

(ii) breaches of environmental protection legislation causing or threatening material harm to the environment (as defined in the *Protection of the Environment Operations Act 1997*),

arising in connection with significant surface disturbing activities, including mining operations, mining purposes and prospecting operations, under this mining lease. The notification must be given immediately after the lease holder becomes aware of the breach.

Note. Refer to www.resources.nsw.gov.au/environment for notification contact details.

(b) The lease holder must submit an Environmental Incident Report to the Department within seven (7) days of all breaches referred to in condition 5(a)(i) and (ii). The Environmental Incident Report must include:

(i) the details of the mining lease;

(ii) contact details for the lease holder;

(iii) a map identifying the location of the incident and where material harm to the environment has or is likely to occur;

(iv) a description of the nature of the incident or breach, likely causes and consequences;

(v) a timetable showing actions taken or planned to address the incident and to prevent future incidents or breaches referred to in 5(a).

(vi) a summary of all previous incidents or breaches which have occurred in the previous 12 months relating to significant surface disturbing activities, including mining operations, mining purposes and prospecting operations under this mining lease.

Note. The lease holder should have regard to any relevant Director General's guidelines in the preparation of an Environmental Incident Report. Refer to www.resources.nsw.gov.au/environment for further details.

(c) In addition to the requirements set out in conditions 5(a) and (b), the lease holder must immediately advise the Department of any notification made under section 148 of the *Protection of the Environment Operations Act 1997* arising in connection with significant surface disturbing activities including mining operations, mining purposes and prospecting operations, under this mining lease.

6. Extraction Plan

(a) In this condition:

(i) **approved Extraction Plan** means a plan, being:

A. an extraction plan or subsidence management plan approved in accordance with the conditions of a relevant development consent and provided to the Secretary; or

B. a subsidence management plan relating to the mining operations subject to this lease:

I. submitted to the Secretary on or before 31 December 2014; and

II. approved by the Secretary.

(ii) **relevant development consent** means a development consent or project approval issued under the Environmental Planning & Assessment Act 1979 relating to the mining operations subject to this lease.

(b) The lease holder must not undertake any underground mining operations that may cause subsidence except in accordance with an approved Extraction Plan.

(c) The lease holder must ensure that the approved Extraction Plan provides for the effective management of risks associated with any subsidence resulting from mining operations carried out under this lease.

(d) The lease holder must notify the Secretary within 48 hours of any:

(i) incident caused by subsidence which has a potential to expose any person to health and safety risks;

(ii) significant deviation from the predicted nature, magnitude, distribution, timing and duration of subsidence effects, and of the potential impacts and consequences of those deviations on built features and the health and safety of any person; or

(iii) significant failure or malfunction of a monitoring device or risk control measure set out in the approved Extraction Plan addressing:

A. built features;

B. public safety; or

C. subsidence monitoring.

7. Resource Recovery

The lease holder must optimise recovery of the minerals that are the subject of this mining lease to the extent economically feasible.

8. Group Security

The lease holder is required to provide and maintain a security deposit to secure funding for the fulfilment of obligations of all or any kind under the mining lease, including obligations of all or any kind under the mining lease that may arise in the future.

The amount of the security deposit to be provided as a group security has been assessed by the Minister at **$50,000**.

The leases covered by the group security include:

Mining Lease 1645, 1708, 1709 and 1713 (Act 1992)

9. Cooperation Agreement

The lease holder must make every reasonable attempt, and be able to demonstrate its attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as:

- access arrangements
- operational interaction procedures
- dispute resolution
- information exchange
- well location
- timing of drilling
- potential resource extraction conflicts; and
- rehabilitation issues.

Exploration Reporting

Note: *Exploration Reports (Geological and Geophysical)*

The lease holder must lodge reports to the satisfaction of the Minister in accordance with section 163C of the Mining Act 1992 and in accordance with clause 57 of the Mining Regulation 2010.

Reports must be prepared in accordance with Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales (Department of Trade and Investment; Regional Infrastructure and Services 2010).

SPECIAL CONDITIONS

Note: The standard conditions apply to all mining leases. The Division of Resources & Energy (DRE) reserves the right to impose special conditions, based on individual circumstances, where appropriate.

MINING LEASE

MINING ACT 1992

NO 1750

DATED 3 MARCH 2017

THE MINISTER FOR RESOURCES

OF THE STATE

OF NEW SOUTH WALES

TO

MACH ENERGY
AUSTRALIA PTY LTD
ACN 608 495 441

Mining Lease Application No **524**

Mining Lease

Section 63 of the *Mining Act 1992*

I, **THE HON DONALD HARWIN MLC, MINISTER FOR RESOURCES** for the State of New South Wales, pursuant to section 63 of the *Mining Act 1992*, determine Mining Lease Application No **524** by granting a Mining Lease as described in Schedule 1 to **MACH ENERGY AUSTRALIA PTY LTD, ACN 608 495 441**, subject to the conditions set out in Schedule 2.

The conditions set out in Schedule 2 are required to:

- ensure optimal resource recovery;
- prevent, minimise, and offset adverse environmental impacts;
- provide for the ongoing environmental management of the project; and
- ensure that the areas disturbed by mineral production and exploration activities are appropriately rehabilitated.

The rights and duties of a Lease Holder are those prescribed by the *Mining Act 1992*, subject to the terms and conditions of this Lease. This lease does not override any obligation on the Lease Holder to comply with the requirements of other legislation and regulatory instruments which may apply to the Lease Holder (including all relevant development approvals) unless specifically provided in the *Mining Act 1992* or other legislation or regulatory instruments.

SIGNED

Don Harwin MLC
Minister for Resources

Dated: 3.3.17

SCHEDULE 1

Description of Lease

Land: The lease area embraces all land described in the attached lease plan titled **M27410** and approved on **4 October 2016**.

Area:	**31.24 hectares**
Surface Exception:	**Nil**
Depth Restriction:	**15 metres**
Minerals:	**Coal**
Method:	**Open cutting**
Term:	**21 years**
Due expiry date:	**3 March 2038**

PLAN OF PORTION ML 12

PARISH: ELLIS & CLANRICARD

COUNTY: BRISBANE

MAP SHEET No. 9033-2-N

REDUCTION RATIO 1: 3,500

MINING LEASE APPLICATION No. 524

MINING DIVISION: SINGLETON

APPLICANT: MACH ENERGY AUSTRALIA PTY LTD

APPLICATION DATE: 06/04/2016

MINING LEASE No.

STATUS:

METHOD: OPEN CUT

SURFACE EXCEPTION / DEPTH RESTRICTION

Embraces the surface & soil below thereof to a depth of 15 metres

NOTES:

Azimuth:

Plans used in the course of this survey/compilation
M27095

Survey declared on this plan for lines

I COLIN GEOFFREY ROGERS
OF MUSWELLBROOK NSW 2333
a surveyor registered under the Surveying and Spatial Information Act 2002, hereby certify that the survey /compilation represented in this plan is accurate and has been completed in accordance with the Surveying and Spatial Information Regulation 2012 and the Surveyor General's Direction for Mining Surveys and was completed on 4/8/2016
Signature :
BOSSI Identification No : 1927

FORM10

Survey Calcs :
Plan Investigated : 30-09-2016
Plan Approved : 4-10-2016
Paper No : T16-1503

R 17009237
D 110097800

M27410

MGA94 ZONE 56		
No.	EASTING	NORTHING
1	297103.06	6428654.88
2	297176.47	6428899.24
3	297310.795	6428931.37
4	297568.97	6429034.39
5	297645.67	6428978.73
6	297839.86	6428827.37
7	297998.20	6428646.87
8	298042.08	6428522.83
9	297725.68	6428567.24
10	298193.745	6428627.59
11	298179.77	6428523.82
12	298176.295	6428497.98
13	298163.845	6428501.125

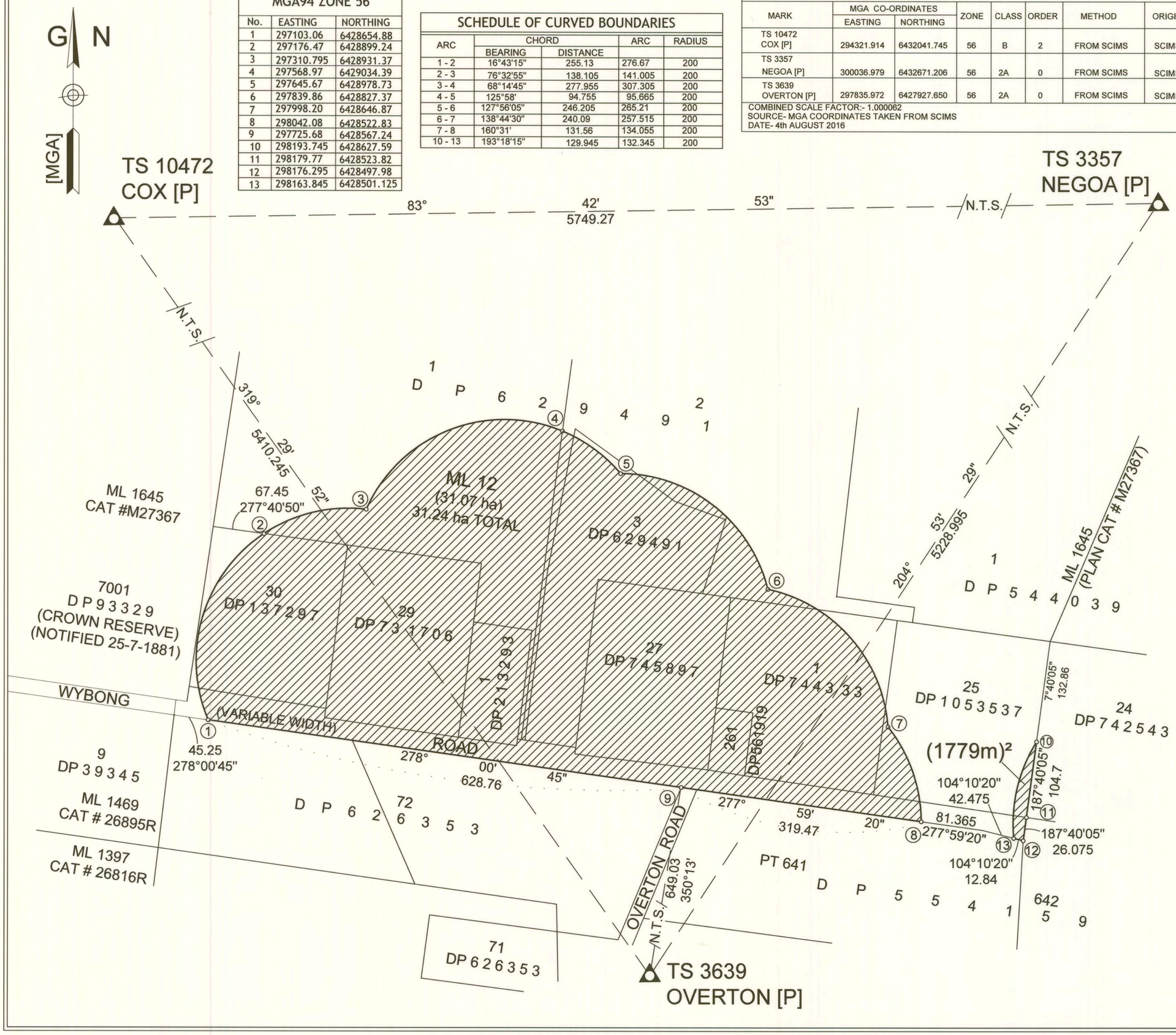
SCHEDULE OF CURVED BOUNDARIES

ARC	CHORD		ARC	RADIUS
	BEARING	DISTANCE		
1 - 2	16°43'15"	255.13	276.67	200
2 - 3	76°32'55"	138.105	141.005	200
3 - 4	68°14'45"	277.955	307.305	200
4 - 5	125°58'	94.755	95.665	200
5 - 6	127°56'05"	246.205	265.21	200
6 - 7	138°44'30"	240.09	257.515	200
7 - 8	160°31'	131.56	134.055	200
10 - 13	193°18'15"	129.945	132.345	200

SURVEYING & SPATIAL INFORMATION REGULATION 2012 CLAUSE 35(1)(b) and CLAUSE 61(2)

MARK	MGA CO-ORDINATES		ZONE	CLASS	ORDER	METHOD	ORIGIN
	EASTING	NORTHING					
TS 10472 COX [P]	294321.914	6432041.745	56	B	2	FROM SCIMS	SCIMS
TS 3357 NEGOA [P]	300036.979	6432671.206	56	2A	0	FROM SCIMS	SCIMS
TS 3639 OVERTON [P]	297835.972	6427927.650	56	2A	0	FROM SCIMS	SCIMS

COMBINED SCALE FACTOR:- 1.000062
SOURCE- MGA COORDINATES TAKEN FROM SCIMS
DATE- 4th AUGUST 2016



Schedule 2

MINING LEASE CONDITIONS 2013

Definitions

1. Notice to Landholders

2. Rehabilitation

3. Mining Operations Plan and Annual Rehabilitation Report

4. Compliance Report

5. Environmental Incident Report

6. Extraction Plan

7. Resource Recovery

8. Group Security

9. Cooperation Agreement

Note: Exploration Reports (Geological and Geophysical)

Definitions:

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Act means the *Mining Act 1992.*

Department means the Division of Resources & Energy within the Department of Industry, Skills and Regional Development.

Environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.

Harm to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997.*

Landholder for the purposes of these conditions does not include a secondary landholder and includes, in the case of exempted areas, the controlling body for the exempted area.

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Pollution incident has the same meaning as in the *Protection of the Environment Operations Act 1997.*

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(b) If there are ten or more landholders, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this mining lease has been granted/renewed; state whether the lease includes the surface and must contain a plan and description of the lease area. If a notice is made under condition 1(b), compliance with condition 1(a) is not required.

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(b) The MOP must identify the post mining land use and set out a detailed rehabilitation strategy which:

(i) identifies areas that will be disturbed;

(ii) details the staging of specific mining operations, mining purposes and prospecting;

(iii) identifies how the mine will be managed and rehabilitated to achieve the post mining land use;

(iv) identifies how mining operations, mining purposes and prospecting will be carried out in order to prevent and or minimise harm to the environment; and

(v) reflects the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979;*
- the *Protection of the Environment Operations Act 1997;* and

- any other approvals relevant to the development including the conditions of this mining lease.

(c) The MOP must be prepared in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* published on the Department's website at www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf/environmental-guidelines

(d) The lease holder may apply to the Minister to amend an approved MOP at any time.

(e) It is not a breach of this condition if:

(i) the operations which, but for this condition 3(e) would be a breach of condition 3(a), were necessary to comply with a lawful order or direction given under the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997,* the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* or the *Work Health and Safety Act 2011*; and *Work Health and Safety Regulation 2011*

(ii) the Minister had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:

(i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;

(ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and

(iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf/environmental-guidelines

Note: The Rehabilitation Report replaces the Annual Environmental Management Report.

4. Compliance Report

(a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.

(b) The Compliance Report must include:

(i) the extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under this mining lease, have or have not been complied with;

(ii) particulars of any non-compliance with any such conditions or provisions,

(iii) the reasons for any such non-compliance;

(iv) any action taken, or to be taken, to prevent any recurrence, or to mitigate the effects, of that non-compliance.

(c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.

(d) In addition to annual lodgement under condition 4(c) above, a Compliance Report:

(i) must accompany any application to renew this mining lease under the Act;

(ii) must accompany any application to transfer this mining lease under the Act; and

(iii) must accompany any application to cancel, or to partially cancel, this mining lease under the Act.

(e) Despite the submission of any Compliance Report under (c) or (d) above, the titleholder must lodge a Compliance Report with the Department at any date or dates otherwise required by the Minister.

(f) A Compliance Report must be submitted one month prior to the expiry of this mining lease, where the licence holder is not seeking to renew or cancel this mining lease.

5. Environmental Incident Report

(a) The lease holder must notify the Department of all:

(i) breaches of the conditions of this mining lease or breaches of the Act causing or threatening material harm to the environment; and

(ii) breaches of environmental protection legislation causing or threatening material harm to the environment (as defined in the *Protection of the Environment Operations Act 1997*),

arising in connection with significant surface disturbing activities, including mining operations, mining purposes and prospecting operations, under this mining lease. The notification must be given immediately after the lease holder becomes aware of the breach.

Note. Refer to www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf/environmental-guidelines for notification contact details.

(b) The lease holder must submit an Environmental Incident Report to the Department within seven (7) days of all breaches referred to in condition 5(a)(i) and (ii). The Environmental Incident Report must include:

(i) the details of the mining lease;

(ii) contact details for the lease holder;

(iii) a map identifying the location of the incident and where material harm to the environment has or is likely to occur;

(iv) a description of the nature of the incident or breach, likely causes and consequences;

(v) a timetable showing actions taken or planned to address the incident and to prevent future incidents or breaches referred to in 5(a).

(vi) a summary of all previous incidents or breaches which have occurred in the previous 12 months relating to significant surface disturbing activities, including mining operations, mining purposes and prospecting operations under this mining lease.

Note. The lease holder should have regard to any relevant Secretary's guidelines in the preparation of an Environmental Incident Report. Refer to www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf/environmental-guidelines for further details.

(c) In addition to the requirements set out in conditions 5(a) and (b), the lease holder must immediately advise the Department of any notification made under section 148 of the *Protection of the Environment Operations Act 1997* arising in connection with significant surface disturbing activities including mining operations, mining purposes and prospecting operations, under this mining lease.

6. Extraction Plan

(a) In this condition:

(i) **approved Extraction Plan** means a plan, being:

A. an extraction plan or subsidence management plan approved in accordance with the conditions of a relevant development consent and provided to the Secretary; or

B. a subsidence management plan relating to the mining operations subject to this lease:

I. submitted to the Secretary on or before 31 December 2014; and

II. approved by the Secretary.

(ii) **relevant development consent** means a development consent or project approval issued under the Environmental Planning & Assessment Act 1979 relating to the mining operations subject to this lease.

(b) The lease holder must not undertake any underground mining operations that may cause subsidence except in accordance with an approved Extraction Plan.

(c) The lease holder must ensure that the approved Extraction Plan provides for the effective management of risks associated with any subsidence resulting from mining operations carried out under this lease.

(d) The lease holder must notify the Secretary within 48 hours of any:

(i) incident caused by subsidence which has a potential to expose any person to health and safety risks;

(ii) significant deviation from the predicted nature, magnitude, distribution, timing and duration of subsidence effects, and of the potential impacts and consequences of those deviations on built features and the health and safety of any person; or

(iii) significant failure or malfunction of a monitoring device or risk control measure set out in the approved Extraction Plan addressing:

A. built features;

B. public safety; or

C. subsidence monitoring.

(e) Resource Recovery

The lease holder must optimise recovery of the minerals that are the subject of this mining lease to the extent economically feasible.

(f) Group Security

The lease holder is required to provide and maintain a security deposit to secure funding for the fulfilment of obligations of all or any kind under the mining lease, including obligations of all or any kind under the mining lease that may arise in the future.

The amount of the security deposit to be provided as a group security has been assessed by the Minister at **$11,996,000**.

The leases covered by the group security include:

Mining Lease 1645, 1708, 1709 and 1713 (Act 1992)

This group security is extended to apply to this lease.

9. Cooperation Agreement

The lease holder must make every reasonable attempt, and be able to demonstrate its attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as:

- access arrangements
- operational interaction procedures
- dispute resolution
- information exchange
- well location
- timing of drilling
- potential resource extraction conflicts; and
- rehabilitation issues.

Exploration Reporting

Note: *Exploration Reports (Geological and Geophysical)*

The lease holder must lodge reports to the satisfaction of the Minister in accordance with section 163C of the Mining Act 1992 and in accordance with clause 57 of the Mining Regulation 2010.

Reports must be prepared in accordance with Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales.

SPECIAL CONDITIONS

Note: The standard conditions apply to all mining leases. The Division of Resources & Energy (DRE) reserves the right to impose special conditions, based on individual circumstances, where appropriate.

ATTACHMENT 3

TABLE 6 OF *FRAMEWORK FOR BIODIVERSITY ASSESSMENT* (OEH, 2014)

Table 6: Maximum allowable increases in the site attribute condition score as a result of proposed ecological rehabilitation works

Site attribute	Allowable increase in the site attribute condition score from zero	Required completion/relinquishment standard for the increase in site attribute condition score
Native plant species richness	0.5	The rehabilitation will achieve >25% of the native plant species richness benchmark for the nominated PCT. Only plant species characteristic of the target PCT may be counted towards native plant species richness.
	1.0	The rehabilitation will achieve >50% of the native plant species richness benchmark for the nominated PCT. Only plant species characteristic of the target PCT may be counted towards native plant species richness.
Over-storey cover	0.5	The rehabilitation will achieve >10% and <25%, or >200% of the percent native over-storey cover benchmark for the nominated PCT. Only over-storey plant species characteristic of the target PCT may be counted towards percent native over-storey cover.
	1	The rehabilitation will achieve >25% and <200% of the percent native over-storey cover benchmark for the nominated PCT. Only over-storey plant species characteristic of the target PCT may be counted towards percent native over-storey cover.
Mid-storey cover	0.5	The rehabilitation will achieve >10% and <25%, or >200% of the percent native mid-storey cover benchmark for the nominated PCT. Only mid-storey plant species characteristic of the target PCT may be counted towards percent native mid-storey cover.
	1	The rehabilitation will achieve >25% and <200% of the percent native mid-storey cover benchmark for the nominated PCT. Only mid-storey plant species characteristic of the target PCT may be counted towards percent native mid-storey cover.
Native ground cover (grasses)	0.5	The rehabilitation will achieve >10% and <25%, or >200% of the percent native ground cover (grasses) benchmark for the nominated PCT. Only native ground cover (grasses) plant species characteristic of the target PCT may be counted towards percent native ground cover (grasses).
	1.0	The rehabilitation will achieve >25% and <200% of the percent native ground cover (grasses) benchmark for the nominated PCT. Only native ground cover (grasses) plant species characteristic of the target PCT may be counted towards percent native ground cover (grasses).
Native ground cover (shrubs)	0.5	The rehabilitation will achieve >10% and <25%, or >200% of the percent native ground cover (shrubs) benchmark for the nominated PCT. Only native ground cover (shrubs) plant species characteristic of the target PCT may be counted towards percent native ground cover (shrubs)
	1	The rehabilitation will achieve >25% and <200% of the percent native ground cover (shrubs) benchmark for the nominated PCT. Only native ground cover (shrubs) plant species characteristic of the target PCT may be counted towards percent native ground cover (shrubs).
Native ground cover (other)	0.5	The rehabilitation will achieve >10% and <25%, or >200% of the percent native ground cover (other) benchmark for the nominated PCT. Only native ground cover (other) plant species characteristic of the target PCT may be counted towards percent native ground cover (other).
	1	The rehabilitation will achieve >25% and <200% of the percent native ground cover (other) benchmark for the nominated PCT. Only native ground cover (other) plant species characteristic of the target PCT may be counted towards percent native ground cover (other).

Table 6 continued.

Site attribute	Allowable increase in the site attribute condition score from zero	Required completion/relinquishment standard for the increase in site attribute condition score
Exotic plant cover	0.5	The exotic plant cover will be <60%. Exotic plant cover must be calculated as a percentage of the total ground and mid-storey cover. Exotic plant cover is measured as total percent foliage cover of all exotics in all strata.
	1	The exotic plant cover will be <45%. Exotic plant cover must be calculated as a percentage of the total ground and mid-storey cover. Exotic plant cover is measured as total percent foliage cover of all exotics in all strata.
Number of trees with hollows	0.5	The number of hollow bearing stags will be >25% of the number of hollow bearing trees benchmark for the nominated PCT. Only stags brought onto the site from an adjoining development area already containing hollows and properly secured may be used as habitat augmentation for this attribute.
Over-storey regeneration	0.5	At least 25% of over-storey species for the nominated PCT are naturally regenerating. Over-storey regeneration is when a second generation of over-storey plants naturally regenerates on the site as a result of reproduction of established over-storey species. Over-storey regeneration does not include juvenile or young plants which have been planted or seeded. Over-storey regeneration must be present across the vegetation zone.
Total length of fallen logs	0.5	The length of coarse woody debris will be >25% of the total length of fallen logs benchmark for the nominated PCT. The active placement of logs that are brought onto the site from an adjoining development area and are placed in a configuration that reflects natural systems can be used as habitat augmentation.